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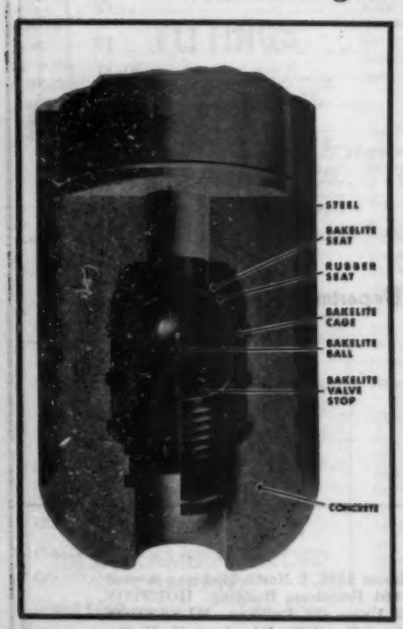

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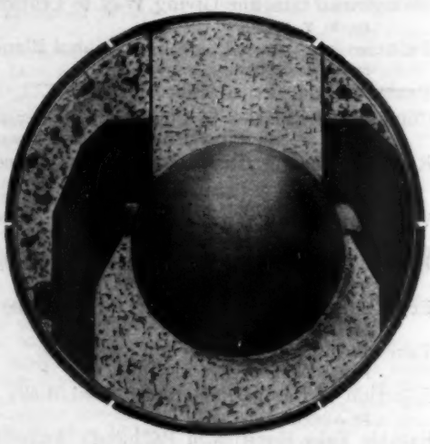

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Developments of Next Few Days to Determine Largely Time of Crude Oil Price Increase

By ANDREW M. ROWLEY

BETTER prices for crude oil, anticipated for some time and expected to be announced within the near future, possibly during the next two weeks, are dependent to a great extent on developments of the next few days. The three-judge Federal Court decision on cases involving proration in East Texas is expected soon but it is believed the Texas Railroad Commission will issue almost immediately after the decision is rendered an order covering any points in present proration regulations which may be held to be illegal by the Court.

If potentials are taken in the Oklahoma City Field, as ordered by the Corporation Commission of Oklahoma, a substantial increase in production during the taking of the potentials may be expected. This increased production from Oklahoma City, added to the excess production being brought to the surface in East Texas normally (which may be increased during any period of readjustment of proration orders there) and the fact certain wells in the Conroe Field of Texas have been producing greatly in excess of allowables, are factors which large buyers of crude oil will consider before making announcements of changes in the crude oil price schedules.

The best information available indicates large quantities of crude oil are being produced in the East Texas Field in excess of allowables and that this oil is being moved to markets. An interesting tabulation of figures on this matter is published on page 32 of this issue. Testimony presented at the oil investigation in Oklahoma City indicates large quantities of crude oil produced there and shipped in violation of proration regulations. And those in close touch with conditions at Conroe report wells producing as high as 6,200 barrels a day whereas the allowable per well is 100 barrels.

These are the conditions which have a direct bearing on the crude oil price structure and also affect the gasoline price as gasoline manufactured from illegally produced crude oil sold under posted prices is marketed at cut prices. It is these conditions which will postpone the return to better prices for both crude oil and gasoline.

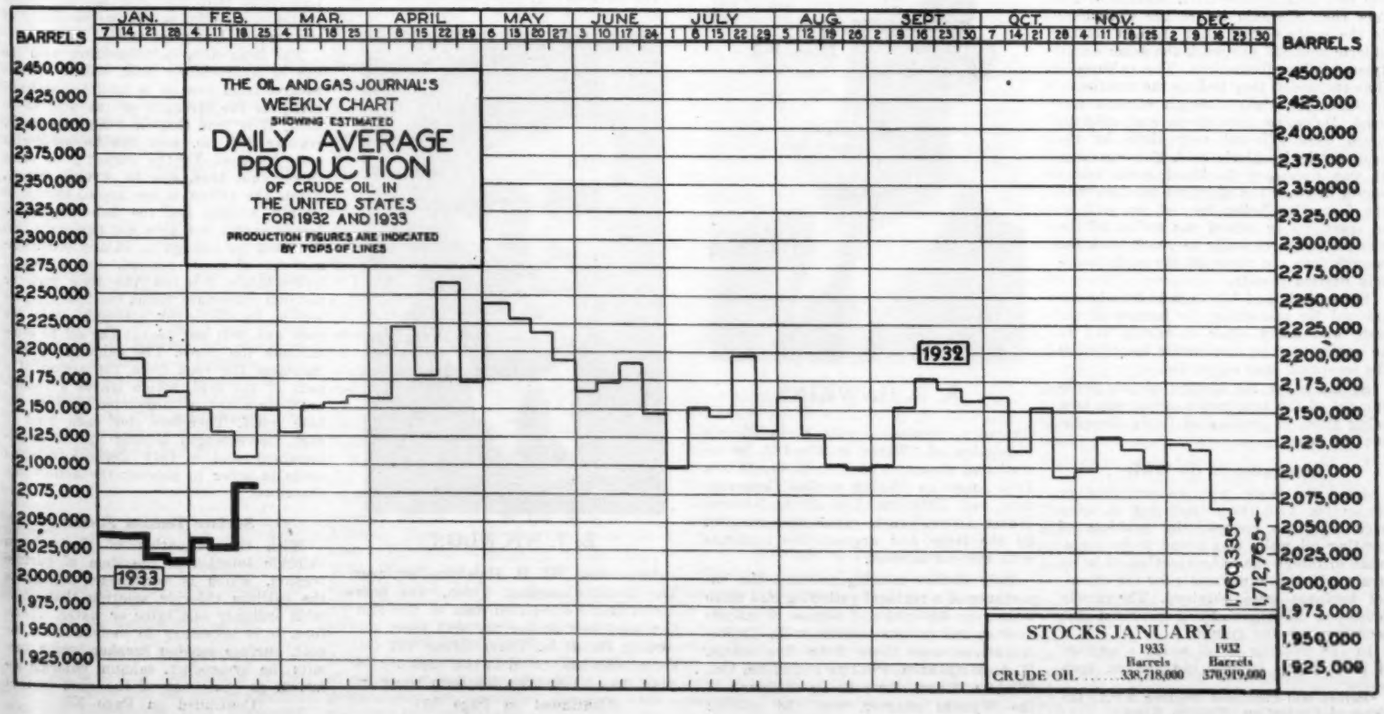
The situation in Oklahoma is being watched closely. Rumors have been current to the effect the governor of the state has already prepared an order for the opening of the Oklahoma City Field, that is, removing restrictions regarding production there. Others seem confident if the governor does take any drastic action in the matter, he will order the field closed in entirely

Crude Oil Production in the United States

Estimated daily average production for the week ending February 18 and a comparison with previous week and one year ago, follows:

	Feb. 18	Feb. 11	Feb. 20, 1932
Oklahoma—			
Oklahoma City	127,310	87,455	80,090
Seminole-St. Louis	106,865	96,270	129,403
Remainder of State	194,105	190,490	204,072
Total Oklahoma	428,280	374,215	413,565
East Texas—			
Lathrop	114,949	114,710	98,195
Kilgore	91,353	92,095	87,056
Joiner	93,761	93,692	93,820
Total East Texas	300,063	300,497	279,071
West Texas	157,987	157,935	175,962
North Central Texas	71,792	69,661	72,048
Texas Panhandle	36,912	42,343	49,415
East Central Texas	58,745	57,954	55,236
Gulf Coast—Texas	130,246	131,839	106,152
Southwest Texas	53,535	52,385	59,545
Total State of Texas	809,280	812,614	797,429
Kansas	102,565	99,460	98,980
North Louisiana	28,760	30,415	28,495
Gulf Coast—Louisiana	33,595	32,243	27,609
Arkansas	31,645	31,450	33,500
Eastern Fields	106,000	109,000	120,000
Rocky Mountain area	76,273	75,301	83,639
California—			
Santa Fe Springs	53,750	54,000	66,000
Long Beach	68,000	67,500	79,500
Playa Del Rey	12,250	12,250	19,750
Elwood	13,750	12,250	17,000
Kettleman Hills	57,250	55,500	60,750
Remainder of State	262,000	260,500	260,000
Total California	467,000	462,000	503,000
Total United States	2,083,398	2,026,698	2,106,217

Increase 56,700 bbls. daily.



Development of Acid Treatment of Oil Wells Involves Careful Study of Problems of Each

By SHERMAN W. PUTNAM
Secretary, Dowell, Incorporated, Midland, Mich.*

The history of the acid treatment of deep wells dates back to about 1894, when the first lime wells were treated with hydrochloric acid for the purpose of increasing oil production. Since that date practically every commercial field has, at one time or another, had some producer in it who attempted to apply the acid treatment in an effort to increase the porosity of the rock and eventually increase oil production.

It was not, however, until 1932 that the procedure was sufficiently developed to make it a commercial success. The development to a successful conclusion of this process came about through the activities of the Dow Chemical Co. of Midland, Mich., who did their first work in connection with brine wells from which they obtain all of their raw materials.

An attempt was made to reintroduce into the ground the brine from which certain raw materials had been extracted and by having this brine take back from the rock these materials which it had lost, it was thought that the brine supply could be conserved.

The first experiments were carried out on a purely theoretical basis, but the results did not prove to be satisfactory. The method used consisted of dumping various kinds of raw acid into the well, hoping that it would find its way through the proper rock. In some cases, the results more or less were gratifying. In other cases no results at all were obtained, but enough information was gathered to emphasize the fact that a more careful study must be made and the problem approached from a scientific standpoint in order to obtain the results that were desired. With this in mind, the experiments were carried further and accessories to the treatments were developed.

Necessary to Blend Acids

Later it was found necessary to discontinue the use of straight hydrochloric acid for well treatments—first, because of the fact that it would injure the equipment in the well; second, that straight hydrochloric acid did not work the same on all types of lime formations. The calcareous lime responded very well to the treatment, provided the right strength of acid was used. Dolomitic formations and silicious limes were affected very little by the ordinary hydrochloric acid. Consequently, it was necessary to blend acids which would increase the chemical reaction with the formation being treated, as well as to speed up or retard the action of the blended acids, in order to reach back far enough into the pores of the rock to obtain desired results.

Brine seals and blankets had to be developed for protecting the bottom of the well, and many other chemicals had to be worked out on a scientific basis before the treatment was successful.

So much for the history of the development of the treatments which are now being given in various oil fields throughout the country.

Application to Oil Wells

After the work was accomplished in connection with the introducing of brine back into the ground, the problem of treating oil wells was found to be somewhat different than the treating of brine strata where raw materials for the chemical business were obtained. The newly developed Michigan Field provided the necessary proving ground.

In the treating of oil wells, a number of new factors entered the picture, such as paraffin trouble, sludge, open hole, hole below the pay, brine encroachment, etc. Consequently, the solution of these problems from the chemical angle required a considerable amount of time, effort and research.

In discussing the treatment given to various oil wells, no attempt will be made to discuss the exact treatment for any particular well, due to the fact that each and every well is different even though it be an offset well and in the same pay formation.

The first procedure that we will discuss will be the acid itself that is used and the inhibitor. The acid which is used is principally of hydrochloric base and if the rock is primarily one that is soluble to a great extent in hydrochloric acid, no other blends need to be used, except the inhibitors that are of paramount importance.

New Inhibitor Developed

In order to be sure that the equipment in the well would not be damaged, it was necessary to develop a new inhibitor different from any that had ever been on the market. The use of an inhibitor in hydrochloric acid was not new to the metal trade. Pickling acids are all inhibited, so as to prevent too rapid an action on the metal. On the other hand, in pickling, two factors have always been necessary to guard against. One is that the metal does not stay in contact with the acid for a long period, and in most cases this time does not exceed five minutes. The second factor is hydrogen embrittlement, which is very apt to take place in the use of the ordinary type of inhibited acid. Most of the concerns who do pickling with inhibited acids arrange to take care of these factors by various and sundry processes, none of which could be applicable to the oil well. Hydrogen embrittlement is especially dangerous on rods and cables used in pumping, if they have been under strain for a long time.

So far as destructive action is concerned on the well itself from the use of any type of acid, disastrous results cannot be detected immediately after the well is treated. A number of companies have started to treat their own wells, feeling that if bad results were not obtained immediately following the treatment, they were safe from having injured the well. Generally speaking, it takes about three months for the bad results to become sufficiently noticeable to cause interruption of the well service, although in some cases three days have been sufficient. In other words, to be assured that no bad results will be obtained from a treatment, a long period of time must elapse before a decision can be made.

Corrosion Rates

One company used an inhibited acid which caused corrosion at the rate of .108 pounds loss per square foot per 24-hour day. The hydrochloric acid alone causes .210 pounds loss per square foot per day, whereas the inhibitor used in all Dowell acids limits to only .001 pound loss per square foot per day. Some have maintained that, by putting oil in the well ahead of the treatment, as well as back of the treatment, they would eliminate the acid coming into contact with the iron itself, thereby being fairly safe. This is not true, because at every break in the pipe, acid goes where the oil does not exist and there are a certain number of chemicals in the oil with which the hydrochloric acid will react. Consequently the threaded parts of the pipe are always in contact with the acid and it is highly important that the acid be sufficiently inhibited to eliminate any possibility of the threads being damaged.

The next item in connection with the use of hydrochloric acid, which we will assume from now on is inhibited satisfactorily is the strength of the acid to be used. It is true that in some formations, regular 20° Be. acid can be used with some success. In the majority of cases this is not true, due to several factors. First, the action is too rapid, so that it simply washes out the hole, making a larger cavity but does not penetrate into the rock far enough to do any particular amount of good. Second, the action of hydrochloric acid on the lime rock or calcium carbonate forms calcium chloride which, in sufficient strength seals the rock and will not permit the oil to come through the pores. The calcium chloride insulates the rock from the action of a part of the acid, which leaves a considerable amount of unreacted acid in the hole itself. Therefore, for each kind of rock, the strength of acid has to be determined and a very definite dilution made in order to prevent the action just described.

Surface Tension Factor

With the formation of the calcium chloride solution is the item of surface tension, which is very much higher in the calcium chloride solution than it is with ordinary salt brine or water. Therefore, it is necessary to include with the acid, surface tension breaker which permits the by-product, calcium chloride solution, to come out of the rock instead

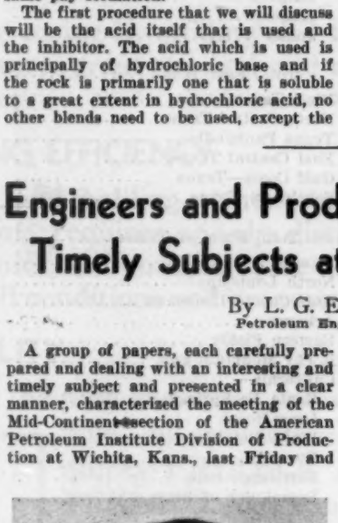
(Continued on Page 55)

*Before Mid-Continent meeting A.P.I., Division of Production, Wichita, Kans.

Engineers and Production Men Discuss Timely Subjects at Wichita Meeting

By L. G. E. BIGNELL
Petroleum Engineering Editor

A group of papers, each carefully prepared and dealing with an interesting and timely subject and presented in a clear manner, characterized the meeting of the Mid-Continent section of the American Petroleum Institute Division of Production at Wichita, Kans., last Friday and



R. R. HAWKINS

Saturday. Beginning with E. R. Filley's discussion of "Taxes in the Oil Industry" and closing with Dr. H. D. Wilde, Jr.'s paper on "Value of Gas Conservation and Efficient Use of a Natural Water Drive," each paper was received by the large and appreciative audience with evident interest.

This district meeting assumed the importance of a regional gathering and there were over 400 men and women in attendance at the various sessions held. Representatives were there from five states. H. L. McQuiston, Phillips Petroleum Co., Wichita, Kans., the retiring chairman of the Wichita chapter, was the guiding spirit of the local group in preparations for and conduct of the meeting.

Friday evening the banquet was held in the ballroom of Allis Hotel and more than 300 guests attended and heard addresses by Mayor Harry Cottman of Wichita; H. M. VanAuken, executive director of the Wichita Chamber of Commerce; J. A. Vickers, Vickers Petroleum Co.; and Thurman Hill and J. W. Greenleaf of the Kansas Public Service Commission. W. F. Lilleston of Wichita acted as toastmaster.

A luncheon was served at noon Friday by the All Steel Products Co. and attended by more than 200 guests.

On Saturday at the close of the technical sessions, R. R. Hawkins, engineer, The Texas Company, Tulsa, was nominated and elected chairman of the Mid-Continent section for the next year, succeeding David L. Trax, Gypsy Oil Co., Tulsa, who has served in this capacity for more than 14 months, his term being ex-

E. J. NICKLOS

(Continued on Page 55)

Unique Installation at Canadian Refinery Provides for the Refrigerated Storage of Gasolines

By C. O. WILLSON

The Imperial Oil Refineries, Ltd., refinery operating subsidiary of the Imperial Oil, Ltd., has perfected an unusual method of providing storage for light gasoline fractions obtained from the absorption plant operations at its Sarnia, Ontario, refinery. Briefly described, the Sarnia installation provides for refrigerated storage of absorption gasoline, the cooling obtained through evaporation of the liquid.

The Sarnia plant of the Imperial company is the largest refinery in Canada having a crude oil capacity of 22,000 bbls. daily with well balanced cracking facilities of the Tube and Tank type. Gases from the cracking stills and other phases of the refinery operation are recovered in a large gasoline recovery and stabilizing plant. The Canadian market has a high standard in motor fuel specifications as regards volatility and the products of the gasoline recovery plants for that reason are especially valuable. The demand for these volatile fractions is not uniform throughout the year and it became desirable at the Sarnia refinery to provide storage during the summer months when excess production was available for use during the winter months when more volatile motor fuels are required.

The plan in use at the Sarnia refinery provides for the storage of absorption gasoline in one tank which has a capacity of 80,000 bbls. All the gasoline from the recovery plant is run to this tank and is available for blending as needed.

Method of Operation

In the operation of the refrigerated absorption gasoline storage system the storage tank is cooled by evaporation from the liquid in it. These vapors are compressed, condensed and returned to the tank as liquid in one continuous operation so that nothing is lost from the system. The temperature of the tank is automatically fixed by the composition of the product stored and is the temperature at which this liquid has a vapor pressure corresponding to the pressure carried on the tank. The amount of evaporation is determined by a heat balance over the tank.

The stabilized production of absorption gasoline at Sarnia has the following representative analysis:

	Weight per cent	Mol. per cent
Propane	0.6	0 92
Butane iso	12 1	14.11
Butane normal	31.9	37.16
Pentane iso	13.5	12 67
Pentane normal	14 7	13.79
Hexane	27.2	21.36

This product, leaving the stabilizer unit at 180 pounds per square inch gauge and 80° F., receives a lye wash for mercaptan removal at 40 pounds per square inch gauge, and is released into the storage tank at atmospheric pressure. The temperature at which this product has a vapor pressure of one atmosphere absolute is 47° F. At this temperature and pressure the composition of the vapors in equilibrium with the liquid is:

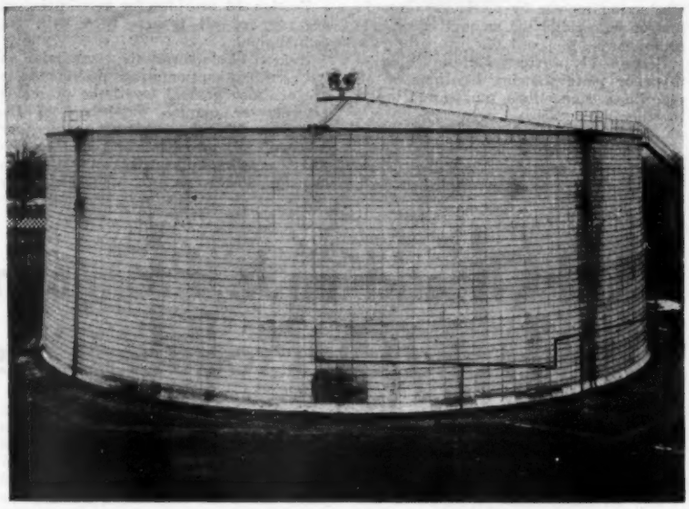
	Vol. per cent
Propane	5.3
Butane iso	39.1
Butane normal	52.3
Pentane iso	6.2
Pentane normal	5.1
Hexane	2.1

In order to condense these vapors at 80° F. they would have to be compressed to 30 pounds per square inch gauge.

Description of Equipment

Following is a brief description of the equipment used in this particular system. A standard 120x42-foot tank, insulated with corkboard, on the shell 2½ inches thick and on the top 2 inches thick, is equipped with pressure relief valves set at 1 ounce per square inch and vacuum relief valves set at one-half ounce per square inch. An 8-inch gas line leads from the top of this tank to the compressor suction. Installed in this line is a pressure regulator which closes at one-quarter ounce per square inch vacuum and is fully open at three-quarter ounce per square inch pressure. The gas engine driven compressor, located in separate building a short distance from the tank, controlled by a speed governor, will develop 50 pounds per square inch in discharge pressure. On the suction and discharge lines are installed two small knockout drums, the former to remove any moisture or scale and the latter to remove lubricating oil. The compressed vapors pass into a commercial water cooled condenser and the condensate, cooled to 80° F. or lower, runs to a condensate drum equipped with a liquid level controller and back pressure regulator. The liquid level controller operates a valve in the condensate outflow line which carries it directly back to the storage tank. The back pressure regulator, set at 40 pounds per square inch, releases any air or noncondensable gases to a vent stack.

Large Storage Tank for Light Gasoline Fractions



80,000-Barrel tank at Sarnia, Ontario refinery of the Imperial Oil Refineries Ltd., used in refrigeration system for absorption gasoline storage

Compressor Operation

The compressor which is used in connection with the tank has a capacity of about 900,000 cubic feet daily. This is sufficient to compress all of the gas released in the tank during summer weather when the absorption plant is running at its designed capacity, at which time there will be 165 bbls. per hour of stabilized bottoms entering the tank at 80° F. The quantity actually handled by the compressor will vary from the maximum summer operation to a minimum of zero, depending upon weather conditions and the rate at which the absorption plant is operating. At this time of the year, due to cold weather, it is not necessary to operate the compressor.

The condensate from the compressor discharge is mixed with the charge to the tank from the absorption plant at a point just outside of the tank and there is no special means for distributing this condensate into the tank bottom.

Gases of the composition shown in the table will start to condense at 130° F. at 40 pounds per square inch. It is, therefore, imperative that the temperature of the gases leaving the compressor be kept above this figure in order to prevent condensation in the cylinder. In order to accomplish this, the cooling water may be cut out of the compressor but if this is not sufficient a steam heater, made by jacketing a section of the suction line, may be used to heat the inlet gases.

The entire operation is practically automatic except for minor manual adjustments to control the compressor outlet temperature.

Hearing on Increasing Conroe Allowable; Complete Control of Output Urged

HOUSTON, Tex., Feb. 20.—Recommendations that the daily allowable of the Conroe Field be increased from the present maximum of 18,500 bbls. to between 35,000 and 40,000 bbls. for the ensuing month, with a graduated increase of approximately 10,000 bbls. for each succeeding month to a maximum of between 75,000 and 100,000 bbls. daily, were made at a hearing for operators of the field before R. D. Parker, chief supervisor of oil and gas division of the State Railroad Commission, at Houston February 14.

With the recommendations, presented by W. W. Scott, chief petroleum engineer of the Humble Oil & Refining Co., it was stated that considering the present extent of the field, the number of wells, and what is known now concerning the reservoir, the field could be produced safely without waste at the rate of 35,000 bbls. daily and that at the rate the producing area is being drilled up the allowable could be stepped up gradually on the basis mentioned above.

Nominations for 40,000 bbls. daily for the remainder of February, March and April were made by the three major purchasers in the field at the close of the hearing, these being distributed as follows: The Texas Company, 10,000 bbls.; Tide Water Oil Co., 15,000 bbls., and Humble Oil & Refining Co., 15,000 bbls. In addition to this outlet, Tide Water Oil Co. also requested that if arrangements could be made that it be permitted to make up 150,000 bbls. additional which the company was behind on its nominations for December, January and the first half of February.

The Conroe Field was pictured by witnesses as covering an area of at least 13,000 acres, which, on the present 20-acre unit basis, would provide for the drilling of approximately 650 wells with full development to be reached by November of this year. Early this month there were 180 producing wells already completed; by the end of May there will be 390 wells, and by the end of September 590 wells. By the time the field is half drilled up, which will be in May, the allowable should be around 60,000 bbls. daily, it was suggested.

The reservoir was described as consisting of one large sand body with some shale breaks with the saturated zone having an average thickness of 56 feet overlain at the top of the structure by a gas cap or free gas area having a pressure of above 2,200 pounds, and underlain by water with the present table being at approximately minus 4,990 feet. The Conroe sand has a porosity of 26 per cent and an extremely high permeability, and, with the oil having a lower viscosity than any other oil yet found in Texas except Pettus and Reagan County, the field, if properly controlled, should have an unusually high per acre recovery.

Control of Production

Complete control of production with uniform withdrawal of oil over the field to maintain an equilibrium between the gas cap above and the water below, and consequent preservation of the pressure in the gas cap, was advocated as most essential to obtain the maximum ultimate recovery. It was pointed out that, al-

(Continued on Page 56)

ARKANSAS CONSERVATION BODY

SHREVEPORT, La., Feb. 20.—The Arkansas Department of Conservation and Inspection has been abolished by the legislature and its functions divided between two other departments. All matters pertaining to oil and gas development and conservation will be under the Arkansas Corporation Commission and all inspection work is a duty of the revenue department. The corporation commission is composed of C. P. Newton, W. H. Childers, and Mr. Pennix.

TEXAS I.P.A. MEETING

FORT WORTH, Tex., Feb. 20.—Decision to work for repeal of the market demand proration law and to oppose supplanting the railroad commission with a new oil and gas conservation body was reached here by directors of the Independent Petroleum Association of Texas.

Fines and Imprisonment for Violators Provided in Proposed Proration Law in Oklahoma

OKLAHOMA CITY, Okla., Feb. 18.—Representative Holliman has introduced House Bill No. 481, an act defining and prohibiting waste of crude petroleum and natural gas in Oklahoma; providing for ratable taking from common sources of supply; defining the powers and duties of the corporation commission; creating the office of umpire; providing for punishment to violators of corporation commission orders and for bribers or bribe takers; creating a "proration fund;" repealing all laws inconsistent with the proposed act, and declaring an emergency.

House Bill No. 483 was introduced by Representative Haile providing for an excise tax of one-sixth of 1 cent per barrel on each and every barrel of petroleum produced in Oklahoma, until June 30, 1935, to be collected by the Oklahoma Tax Commission and turned over to the state treasurer to be deposited to the credit of the proration fund, the money to be used to pay the salaries and expenses of the proration umpire and his forces. No limit is placed on what may be collected under this act. No provision is made for collecting the tax on a basis of a stipulated volume of production. On the basis of 1932 production in Oklahoma such a tax would raise about $240,000 in a year.

The following is a digest of House Bill No. 481:

Section 1 is devoted to definitions.

Section 2 defines "waste" of oil, which "shall include economic waste, underground waste, surface waste, and waste incident to the production of oil in excess of transportation or marketing facilities, or reasonable market demand," and such waste is prohibited.

Section 3 defines waste as applying to gas wells, "and in addition to its ordinary meaning, shall refer to and include the wasteful or uneconomic utilization of natural gas, the escape, blowing or releasing of natural gas into the open air . . . in excess of the amount which is necessary in the efficient drilling or operation of the well."

Provides Ratable Taking

Section 4 authorizes the corporation commission to regulate the production of oil and gas so as to prevent "the inequitable or unfair taking from any common source of supply, and to prevent unreasonable discrimination in favor of any one such common source of supply against another."

Section 5 authorizes the commission to consider small wells and wells making water in the issuance of regulations, and continues "as to any wells drilled and completed into a common source of supply that had not been discovered and oil produced therefrom prior to the enactment of this act, the commission in determining and fixing, under the provisions of Section 4 hereof, the proportion of oil from such common source of supply that may be produced from any such wells may give consideration to the ratio that the acreage in the lease or property on which such wells are located drained by them is to the aggregate acreage of the leases or properties upon which all other wells producing oil from said common source of supply are located and is drained by them."

Section 6 authorizes the taking of potentials of each well or from each lease, in a common source of supply as provided by a commission order.

Apply to All Pools

Section 7 empowers the commission to make proration laws, and provides that the orders shall be applicable to all pools in the State, the commission may designate.

Section 8 authorizes the commission to require meters on all pipe lines, including major carriers, gathering lines and other lines which might be designated under either heading. The meters must be approved by the commission or the field or state umpire.

Section 9 provides for the filing of reports on all oil purchased or transported.

Section 10 provides for the filing of production reports by producers on wells and/or leases and the amount of oil sold or otherwise disposed of.

Section 11 provides for the filing of maps or plats showing locations of all pipe lines, connections, pumps and tanks, together with size and capacity.

Filing of Reports

Section 12 provides for filing of reports on (a) the quantity of oil produced, (b) the quantity of oil removed by each operator from his or its leases or properties, (c) or from each well, and (d) the amount of oil run to storage or delivered to common carriers or purchasers. Penalty for refusal or failure to make these reports may be fixed at shut down of the property by an order of the commission.

Section 13 provides for verification of accuracy of all reports filed with the commission.

Section 14 empowers the commission on its own motion, or upon petition from the attorney general or of the proration attorney or umpire, on behalf of the State, or of any operator, producer or taker of oil, to make rules and regulations covering proration only upon a hearing of the petition and then only after publication or notice is given 10 days prior to the hearing. The commission is given power of a court of record; the section covers other procedure of the commission in holding hearings.

Routine Provisions, Eetc.

Section 15 further defines the powers of the commission and provides punishment for contempt, either before the commission or against any of its rules or regulations.

Section 16 provides for the filing of petitions and records with the commission.

Section 17 provides for taking of depositions of witnesses residing in or out of the State.

Section 18 empowers the commission to

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John H. Markham Jr., Prominent Oil Executive, Banker and Oil Producer Dies of Pneumonia

John H. Markham, Jr., died in Mercy Hospital in Chicago on Friday, February 17, after a brief illness of pneumonia. He was 57 years old.

Mr. Markham was president of the Petroleum Corp. of America, chairman of the board of directors of the Exchange Banks of Tulsa, a director in the Tide Water Associated Oil Co., and an individual oil producer. He was one of the most widely known oil men in the United States.

Mr. Markham, who had been a resident of Tulsa for 17 years, was in New York on business connected with the companies with which he was prominently associated, and on his way home to Tulsa stopped off at Chicago. He was feeling better than he had for months, and wired Mrs. Markham to join him, which she did, arriving in Chicago, Saturday, February 11. On the following Monday, still feeling well and with no suspicion that he was sick, Mr. Markham made an engagement with his physician, whom he had often consulted. He said he wanted to check up on himself. The doctor found a pleurisy condition but did not tell his patient so. He asked him to go to Mercy hospital where X-ray photographs could be taken. The illness developed rapidly and at the conclusion of a consultation of Chicago physicians it was given out that the patient was ill of pneumonia, and in a very serious condition. Mr. Markham's children and brothers and sisters were notified and all of his immediate family were with him when the end came.

Distinguished Oil Man

The death of John H. Markham, Jr., removes from the industry one of its most distinguished members. He was one of the three oil men picked by President Wilson to organize the petroleum division of the War Service Board, the two others having been the late A. C. Bedford, president of the Standard Oil Co. (New Jersey) and Harry F. Sinclair, president of the Sinclair Consolidated Oil Corp.

Mr. Markham was an oil man from the ground up. He started as a tool dresser for his father, a pioneer drilling contractor, in the Kane Field in McKean County, Pennsylvania, at the age of 18, and at 22 was a contractor in the lower Eastern Field.

Mr. Markham had an early ambition to become an oil producer, and between contracts to drill for others, he acquired leases and drilled for himself, but for many years without success. He was 26 years old when the Lucas gusher was drilled on Spindle Top, near Beaumont, Tex., and he joined in the rush to that

—Photo by Rivkin.

JOHN H. MARKHAM, JR.

new oil region. He had never seen a rotary drilling outfit but after watching a rotary crew drill one well he boldly hired out as a rotary driller to a small syndicate of operators on their first drilling venture. Mr. Markham drilled the well successfully. It was a gusher, and the owners were so pleased they made Mr. Markham a gift of the tools, which set the young man up in the business of contracting in a field where cable tools were considered practically useless.

He had no better luck as a wildcatter in Texas than he had had in the East and he moved north to Kansas. He was still a drilling contractor, but was as determined as ever to become a producer, and in 1905, after a number of discouragements, he found oil on the famous "graveyard lease" in Montgomery County, Kansas, which put him definitely in the class to which he aspired. From that time on his road to wealth was steady. He operated successfully in the Nowata Field and the discovery of the deeper pay in the Cushing Pool found him with two leases in the heart of that big Oklahoma field. The price of oil was low, the pipe line facilities so limited that a part of the production had to be either stored by the producer or kept shut in. Mr. Markham laid gathering lines, built a small pump station and erected steel tanks to take care of his oil the pipe lines could not handle. He had 800,000 bbls. of crude oil in storage when the Carter Oil Co. bought him out. The exact figure paid was never officially given out. It was said to have been $2,000,000.

Successful in Other Fields

As an oil operator Mr. Markham preferred the Bartlesville sand and for years he "played" that structure with great success through Nowata, Washington, Osage and Pawnee Counties, with occasional successful ventures in Butler County, Kansas, and in Creek, Okmulgee and Muskogee Counties in Oklahoma. He often operated with partners, scattering his ventures and depending upon the law of averages to make his investments pay. He operated with the Tidal Oil Co., Gypsy Oil Co., Sinclair Oil & Gas Co., and other corporations, and with individual oil men. When Mr. Markham left Texas for Kansas it was with the determination to never again operate in that state, but when the Ranger Field was opened he acquired leases from the Texas & Pacific Coal & Oil Co., and taking the Tidal Oil Co. in as a partner, drilled some big wells in that field.

Before the Oklahoma crude oil market dropped from its high posted price of $3.50 per barrel in 1921 Mr. Markham predicted that a drop was coming and that the market would fall as low as $1 a barrel. When the first 50-cent cut in price came he remarked that he had two wells drilling and that upon their completion he would cease drilling until the depression was over, and he not only did so but never afterward was as active in the field as he had been up to that time. He turned his attention to finance

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Straightrun Gasoline Is Giving Way to Cracked at Rapid Rate Because of Changing Market

By W. T. ZIEGENHAIN

For the first year in the history of the refining industry in the United States, 1932 showed a decrease in the yield of gasoline from crude oil. The decline is actually accounted for by the lesser recovery of natural gasoline, but because this is considered a product of crude oil, it enters into the normal computation of yields. During 1932 cracked gasoline continued to show a gain which more than absorbed the lesser yield of straightrun.

Briefly stated, this is the relationship that existed among the three principal sources of motor fuel for the past year. This relationship is shown over a period of 15 years in the accompanying graphs and probably the most striking fact is the progress cracking has made and the relatively constant position straightrun gasoline has maintained in this time. In graph No. 1, showing the percentage of each type of gasoline produced, a slight break occurred in 1932 in the relative importance of straightrun, however, that offers a hint as to what to expect over the future.

Use Lighter Cracking Stock

There is not much doubt but that the principle of cracking will continue to expand. However, cracking will expand chiefly along the lines of using the lighter fractions of the crude as charging stock despite the fact there still is a large yield of residual oil that could be cracked economically. It is deemed a safe prediction that reforming will be expanded despite the often heard statement that it is not good practice to make 80 gallons of gasoline out of 100 gallons of "gasoline."

Reforming first became an important factor three years ago and its general adoption is becoming more apparent. Many construction jobs are now in progress throughout the industry involving the conversion of existing cracking equipment to permit the use of multiple coils in the heater, the addition of a second heater, the addition of exchangers, etc., all for the purpose of cracking a light charging stock.

The great majority of the larger refineries are fully equipped to crack the topped crude and now they have been installing equipment to crack the lighter. The plants not equipped with cracking equipment are at a distinct disadvantage in supplying a high octane gasoline and they are resorting to lowering the endpoint of the straightrun to improve their position as best they can.

To this extent the ordinary skimming plant is reducing its yield of gasoline and lessening its revenue from each barrel of crude processed. Were it not for this condition it would be more difficult to justify an investment in cracking equipment.

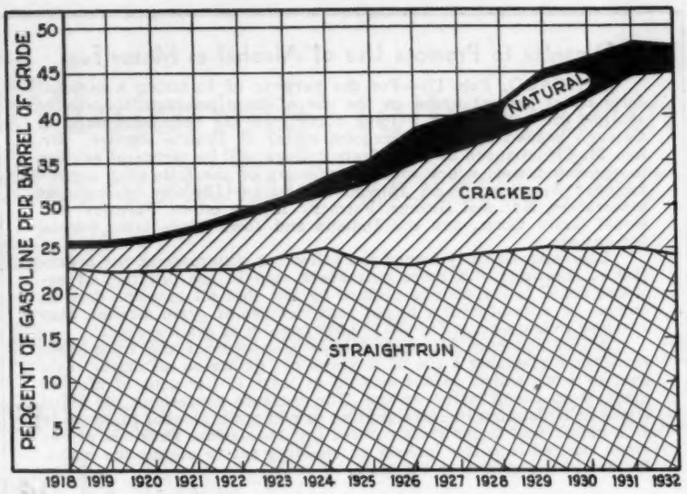
Relation of Revenues

The relationship in revenues between that of a typical Mid-Continent skimming plant and a typical skimming and cracking plant is indicated in the accompanying graph. It was assumed that the yields in each case would remain constant over a ten-year period and the only change made was in the average yearly price for the various commodities.

The margins shown simply reflect the money left from each barrel of crude after selling the finished products and paying for the crude on the field. The margin left must pay for transporting the crude to the plant, carrying on the refining operations, paying interest, depreciation, taxes and other direct and indirect charges.

Because of the larger investment in the cracking equipment it is natural that the margin, as it was figured here, should be larger in the case of the combination plant. However, if the basis for this comparison is correct, a declining margin becomes quite apparent.

Thus, the refiner is faced with a declining revenue advantage in cracking on one hand and the necessity of increasing the octane value of his motor fuel on the other. If history in the refining business is to repeat itself, however, the program of improving quality will win out despite what might now appear to be a growing handicap working in the opposite direction.



Graph No. 1 showing percentage yield of gasoline in United States in accordance with method of recovery from crude oil

Basis of Comparison

To explain the basis for the accompanying graph more clearly it should be mentioned that all prices represent the yearly average of the low quotations for the particular products as the market was reported weekly in The Oil and Gas Journal. All prices reflect the Oklahoma (Group 3) market at the plants. The crude price is the average daily posting of the major crude buyers in the Mid-Continent for 36 gravity oil. Coke was assumed to be worth $2 a ton throughout the period, as the actual prices received in the Mid-Continent are mostly influenced by contracts and the price is indeterminate.

Inequalities enter into the scheme of using the same price on the respective products for both the skimming and cracking plants, for there is a difference in their inherent market value. However, this difference is hard to set out and would be particularly difficult to extend back over past years. Also the relative position of skimming versus cracking would probably not be altered.

The following prices served as the basis for the comparison and an example of the manner in which each year's margin was figured also appears here.

MARGIN OF REVENUE FROM REFINED PRODUCTS AFTER PAYING FOR CRUDE IN FIELD—1923

Skimming

%		Price	Revenue
32	Gasoline	$.0978	$1.23
6	Kerosene	.04	.10
3	Distillate	.0305	.04
22	Gas oil	.0266	.24
35	Fuel oil, bbl.	.9511	.83
2	Loss	.....	...
	Total revenue per bbl. of crude	.....	$3.03
	Crude cost in field	.....	$1.56
	Margin for operation, sales, depreciation, int. and overhead	.....	$.47

Skimming and Cracking

%		Price	Revenue
70	Gasoline	$.0978	$2.85
6	Kerosene	.04	.10
6	Distillate	.0305	.08
10	Fuel oil, bbl.	.9511	.10
2	Coke, ton	2.00	.01
6	Loss	.....	..
	Total revenue per bbl. of crude	.....	$3.14
	Crude cost in field	.....	$1.56
	Margin for operation, sales, depreciation, int. and overhead	.....	$1.58

No attempt here is made to estimate the true margin of profit for either the skimming plant or the cracking plant because too many factors are involved. For this reason some different relationship might become apparent in comparing the two methods of operation but in any case, it is worth repeating that the tendency in refining has been to improve quality at what appears to be a sacrifice of costs at first and then by means of quantity production and simplification, the unit cost on the improved product is reduced.

If pressed sufficiently to reduce costs, it is reasonable to expect a decided change in refinery equipment and methods over the future. From an investment standpoint it is becoming more apparent every day that a refinery in the future will be a cracking plant. One unit will skim, crack and reform. The products will be finished as they leave the unit except possibly for the addition of an inhibitor for the gasoline. A range of pressures from a high vacuum to better than 1,000 pounds will be maintained at different points in this unit and good colored lub oil distillates and cylinder stocks will be recovered direct. This is not so much of a prediction as it is a review of what several plants are actually approximating. The investment in such a plant is low now both for the reason of progress

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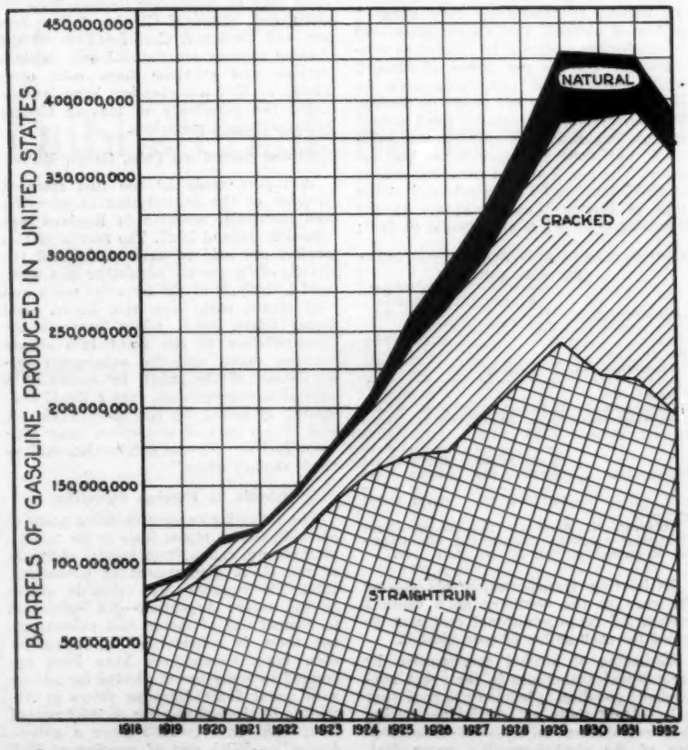

Sources of gasoline from crude showing declining importance of straightrun in relation to cracked over the past 15 years

Many Fallacies to Arguments Advanced in Favor of Laws Requiring Gasoline-Alcohol Blends

By ROBERT C. CONINE
Chicago Bureau, The Oil and Gas Journal

CHICAGO, Feb. 18.—Although flush production in the alcohol fields does not appear to be a problem for the immediate future, farm association chiefs and farm paper editors are busily rallying their forces in Iowa, Illinois, Indiana and other states for a determined effort to outlaw motor fuel which does not contain a specified percentage of alcohol produced from surplus corn. Considerable headway has been made in Iowa by those farm interests who see in the conversion of granaries to distilleries and motor fuel bulk plants the salvation of agriculture. The Iowa legislature Tuesday, February 21, is holding a hearing to determine its attitude toward a pending bill which provides penalties for failure to blend gasoline motor fuel with a certain percentage of grain alcohol.

A number of farm association officials and editors have been interviewed, and with one notable exception these students of agricultural problems are convinced that the petroleum technologists who have reported unfavorably on alcohol-gasoline mixtures as motor fuels are "unscientific" and "far behind the times." None of the information from farm group sources examined to date relates to cost of manufacturing and handling the grain alcohol, although prices for the raw materials are at the lowest point in history.

There have been several attempts to market alcohol-gasoline motor fuel blends in the United States. Thomas L. Wheeler, editor of the Indiana Farmers Guide, relates editorially (February 15, 1933) the fate of one such attempt in Illinois, thus:

"All of this agitation for legalizing alcohol for industrial use reminds the writer that about 25 years ago a similar campaign was put on to obtain a law to permit the manufacture of denatured alcohol. At that time I was editor of a paper in Chicago, and I wrote many 'burning' editorials on the subject, pointing out how the farmer would benefit from having his waste farm products turned into alcohol to be used for many purposes, among them being as a motor fuel.

"The law was passed and then it was soon found that the cost of making the alcohol was so high that it could not be sold cheaply enough to make its use popular or economical.

"As a practical means of farm relief, the plan of turning surplus crops into alcohol to take the place of gasoline is rather visionary. It is not unlike the promises made farmers that they could dispose of their cornstalks for making paper. It was more of a hope than a reality."

When Cost Was Not Factor

One alcohol-gasoline motor fuel marketing experiment may be remembered which failed in spite of the fact that the alcohol was bought at a much lower price than the cost of the gasoline. In 1921 Standard Oil Co. of New Jersey entered into a contract to purchase ethyl alcohol at surplus dump prices which figured at 10 cents a gallon under their own cost of gasoline. The company introduced an alcohol-gasoline motor fuel in the Washington, D. C., and Baltimore areas, and withdrew the product from these markets after two months because of difficulties connected with the physical and chemical behavior of the blended motor fuel. It is significant to note that anhydrous alcohol was used so that the danger of water saturation was lessened with increased percentages of alcohol in the blend.

Points to be covered here in the consideration of the alcohol-gasoline motor fuel proposals are: Costs involved in the production of corn alcohol; competitive alcohol sources; factors governing marketing of alcohol-gasoline (petrol) blends in foreign countries; results of tests to determine suitability of alcohol in gasoline as a motor fuel blending agent.

Organize to Promote Use of Alcohol as Motor Fuel

CHICAGO, Feb. 17.—For the purpose of fostering a national farm relief project based on the use of farm products to provide alcohol for motor fuel, a joint committee has been organized in Chicago headed by C. V. Gregory, editor of Prairie Farmer. Dr. Leo M. Christianson of Iowa State college will be technical adviser to the committee, which includes officers of the following organizations: American Farm Bureau federation, Illinois Agricultural association, National Grange, Farmers' Equity union, Farmers' National Grain Corp., and the Indiana and Iowa State farm bureau federations.

Chairman Gregory issued the following statement at the organization meeting: "A more permanent step in the program of national relief is the plan to require by law that all gasoline used in motors be diluted with a 10 per cent mixture of grain alcohol, thus creating a new market for 680,000,000 bushels of grain a year."

A bill has been introduced in both houses of the Iowa state legislature assessing a tax of 10 cents per gallon on all motor fuels sold in Iowa which do not contain at least 10 per cent of alcohol made from corn, barley or rye. The measure represents the third phase of legislation in Iowa tending to add grain alcohol to gasoline as a motor fuel under state control and regulation. Previous provisions enacted into law include an enabling act to permit the manufacture of the alcohol in the state.

Cost Consideration

Warren N. Watson, chief of the chemical division, U. S. Tariff Commission, in 1930 presented the results of a comprehensive study of costs of producing industrial alcohol from corn and blackstrap molasses. Doctor Watson stated that in commercial practice one bushel of corn yields about 2.4 gallons of alcohol, and 2.7 gallons of blackstrap yield about 1 gallon of alcohol. The approximate cost of converting molasses to alcohol he estimated at 7 cents per gallon of alcohol, while the cost of converting corn he placed at 10.5 cents per gallon of alcohol. The conversion cost includes total factory expense, insurance, depreciation and overhead, but does not include selling expense. The No. 2 shelled corn was selling at 83.75 cents to 94 cents a bushel at the time of Doctor Watson's study. In the following table prices are brought to date:

COST OF ETHYL ALCOHOL PRODUCTION*
(Per wine gallon)

	Cents per bushel		Cents per gallon	
Raw material—	18	9	9.5	6.5
Corn	7.50	3.75		
Molasses			25.65	17.55
Barley and chemicals	5.01	5.01	0.50	0.50
Total raw materials	12.51	8.76	26.15	18.05
Conversion cost	10.54	10.54	7.00	7.00
Denaturization	2.125	2.125	2.125	2.125
	25.175	21.425	35.275	27.175
Dehydration	5.000	5.000	5.000	5.000
	30.175	26.425	40.275	32.175

*Warren N. Watson, "The Facts About Industrial Alcohol," Chemical & Metallurgical Engineering, Vol. 37, No. 3, p. 100.

Estimating transportation charges on the corn to the distillery at 6 cents a bushel, 2.5 cents additional cost may be added for each gallon of corn alcohol.

Estimates of alcohol consumption by agricultural authorities in the event non-alcoholic gasoline is banned are such that it is evident these authorities are basing their calculations on a nation-wide adoption of the alcohol-gasoline motor fuel. The transportation angle, therefore, is an important consideration. That the railroads figure largely in the plans of the alcohol farm relief movement may be indicated by the following freight rates: From Iowa to New York, 27.5 cents a bushel; from Iowa to the West Coast, 42.5 cents a bushel; from Cairo, Ill., to New Orleans, by water, 11.4 cents a bushel.

Other Sources of Ethyl Alcohol

Petroleum technologists estimate an average cost of less than 20 cents per gallon for ethyl alcohol produced by cracking of fixed refinery gases. Among interests producing alcohols from petroleum may be mentioned Barnsdall Refineries, Inc., Standard Oil Co. of New Jersey, and Carbon & Carbide Chemical Co. Among sources are natural gas, calcium carbide and ethylene from coke oven gases. In England chemists have investigated the possibility of making alcohol from cellulosic materials.

Alcohol from Corn Cobs, Grass, Husks

A report made by the fuel research division of the departtment of scientific and industrial research in England was issued in July of 1927. The results of this project are said to have established the details of "a process consisting in a weak acid hydrolysis of the material (corn and rice straw, corn cobs, rice husks, sisal hemp waste, etc.), which converts the hemi-cellulose of the plant into simple pentose sugar, and the subsequent fermentation of the sugar, by means of a special micro-organism, into a liquid consisting of about 90 per cent of alcohol and 10 per cent of acetone—a more efficient fuel for internal combustion engines than alcohol alone."

Blends in Foreign Countries

The following reports covering place of alcohol-gasoline motor fuels in the foreign markets are taken from special circulars of the U. S. Department of Commerce, 1932. The countries are taken in alphabetical order: Argentina—No legislation to compel use of motor fuel substitutes, but there is considerable agitation for such laws. Committees have been appointed to study use of alcohol for mixing with motor fuels. Gasoline prices in Argentina in the last quarter of 1932 ranged from 23.8 cents to 29.2 cents a gallon. Australia—With cost of gasoline at 38.2 cents a gallon, one major company is using 5,700 bbls. of alcohol made from molasses, per year, in gasoline marketed in Queensland. Austria—Law passed to regulate mixture of alcohol with motor fuel, February 1, 1931, and became effective May 1, 1931. Law is not compulsory if the price of alcohol rises above the wholesale price of gasoline. (The government monopoly on alcohol is absorbing cost difference so as to keep the alcohol price down.) Gasoline price in Vienna was 30.2 cents a gallon for the first quarter of 1932. Brazil—Law requiring importers of gasoline to buy and mix in 5 per cent of alcohol has given rise to many complications and the law has not yet become effective. (No alcohol has been used because it has not been available. The petroleum companies posted bonds in accordance with the alcohol law, and now cannot get these bonds back.) Chile—The government enacted legislation, August 28, 1931, providing that domestic alcohol must be mixed with all gasoline except that used for aviation. Price of gasoline at Santiago in the first quarter of 1932 ranged from 41.3 cents to 46.2 cents a gallon, including duties and taxes amounting to about 20 cents a gallon.

Cuba—A bill was introduced in Congress in December of 1931 which would require the mixture of alcohol with gasoline. No action is reported to have been taken on the bill. Czechoslovakia—Alcohol has been used for motor fuels although there was no law until recently to enforce mixing. A recent report says that a bill has been passed, effective September 1, 1932, making the mixing of alcohol in motor fuels compulsory. Alcohol used annually for motor fuels totals 34,000 bbls. The price of gasoline at Prague in the first quarter of 1932 was 28 cents a gallon. Finland—Although Finland is a large producer of alcohol, none is used in motor fuels. The price of gasoline at Helsingfors in the first quarter of 1932 ranged from 18.7 cents to 23.9 cents a gallon.

Situation in France

France—Two pieces of government legislation mean that alcohol of specific quality must be purchased by gasoline importers in volume corresponding to 10 per cent of the gasoline, but decrees do not mean that all of the gasoline imported must be mixed with the alcohol but only that gasoline which is used for heavy motors must be mixed at the rate of 25 to 35 per cent. In this country 168,000 bbls. of alcohol were used in 1930 for motor fuels. (Private consumers will not buy alcohol fuel, so that the government and Paris buses are the only users.) Oil companies are refusing to purchase 10 per cent of alcohol and fines against the companies are accumulating. A bill is now, February of 1933, before the Chamber of Deputies to remit fines for one or two years because of the situation. Germany—The government in August of 1930 issued a decree which made it compulsory for importers and domestic manufacturers of gasoline to purchase a certain amount of alcohol from the German Federal Alcohol Monopoly. The amount was 2.5 per cent at first, but has been raised gradually until it is 6 per cent at present. Quantity of alcohol used annually in motor fuel in Germany totals 425,000 bbls. More recent reports indicate that the alcohol percentage in motor fuel will be raised to 10 per cent. Cost of gasoline for the first quarter of 1932 ranged from 27 to 32.2 cents for various cities. Hungary—Royal decree of 1929 makes it compulsory for all gasoline of 0.735 specific gravity or over, to be mixed with alcohol at the

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Motorists today demand better gasoline though they buy less of it

Better gasoline means more cracking, even though consumption is lower

Dubbs cracking makes the highest yield of the best anti-knock gasoline from any charging stock at lowest cost—royalty and all

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Basis of Crude Price

The producers of crude who have borne the burden of proration are inclined to question the theory that the price of crude must be fixed by the price received for refined products, and to inquire, if this is so, whether it is right that it should be so.

Let us suppose, they say, that the price of leather is fixed by the price of shoes and that the price of shoes goes so low that the corresponding price of leather is so unprofitable that it bankrupts the leather business and leather production collapses.

The rejoinder, of course, is that the scarcity of leather will mean higher prices for shoes and consequently higher prices for leather, so that everything will be all right again—except for those who may have been bankrupted in the process.

The protesting crude producer argues that there should be a better system of operating the industry that would distribute the load evenly over the various branches and not pass it back continually to the producer.

As he sees it, the gasoline division is being subsidized at his expense. To this the gasoline branch replies that if the producers did not produce excess crude to be made into distress gasoline the refined market would be able to stay put and so would the crude market.

Which is all very much like the old query, which came first, the hen or the egg?

The theory that the price received for products fixes the price for raw material is after all merely stating the same thing backward.

Primarily, the price of crude is based upon the available supply that can be put on the market as needed. This includes not only the daily production, including excess production, but the production that is quickly available by drilling known reserves.

In comparison gasoline stocks and crude runs to stills from week to week are merely temporary measurements because there is sufficient refinery capacity to take care of any conceivable requirements and there is enough crude oil in storage to guarantee it.

But the refiners are unable to stabilize the situation because the availability of crude sold under the market induces the production of gasoline that can be sold under the market and the first thing we know the gasoline market falls and the crude market follows, but not because the price of gasoline fixed the price of crude but because the under-market price of crude forced the fall in the price of gasoline.

The price of crude was determined by the available supply of oil and the price of products followed.

But this is only part of the story. There is another factor that has become powerful in determining the price of both crude and products and in this case it is the price received for gasoline that affects the price of crude.

This is evasion of gasoline taxes and bootlegging of tax free gasoline. With the tax equal to 100 per cent of the wholesale price of gasoline the tax free bootlegger has a margin for price cutting which his tax paying competitor cannot ignore. The result is a slashing of prices which eventually is forced back on the crude producer who in this case does find the price of his crude fixed by products.

In both cases the industry suffers from similar causes—defiance of the law. Illegal overproduction of crude breaks the crude and refined markets. Tax evasion racketeering breaks the gasoline and then the crude markets.

So, in the crude end we are bound to have proration in some form or other, we cannot get away from it so long as it is necessary to prorate production to requirements, and we cannot expect better prices until it is made effective.

Just as higher gasoline taxes make it more profitable for the gasoline bootlegger to operate since it gives him a larger margin to cut prices, higher prices for crude simply offer the illegal producer a larger profit, a greater incentive.

It used to be argued that higher prices stimulated drilling but nowadays higher prices are more likely to stimulate stealing.

This is the situation before producers. The only sound basis for any raw material is its available supply and its utility value.

Basing crude prices on refined product prices would be inequitable because there are fluctuations in refined prices due to marketing abuses, bootlegging, tax evasion, which cannot fairly be charged to crude producers. The crude producer should not be compelled to bear losses for which he is not responsible.

He has a sufficient burden to carry in being denied compensation for his curtailment because of the failure to make proration effective. Experience has shown him that premature better prices on a false foundation merely postpone the possibility of enjoying them, since each collapse of the market defers stabilization so much longer.

Over-optimistic predictions of doubling or trebling the price of crude within so many days are doing the producer a disservice because raising hopes that cannot be realized.

It is better to look facts in the face. Higher prices before proration is made effective will be a handicap rather than a help by putting a premium on illegal production.

The improvement in the situation following the reported determination to do everything possible to hold production in line with demand encourages belief that better prices are attainable, prices in keeping with available supply, and that these prices await only proof that proration is being effectively enforced.

If stolen oil can be stopped, and it can be if the industry really means to, crude prices can be based on available supply and demand and not upon illegally produced oil turned into price-cut gasoline.

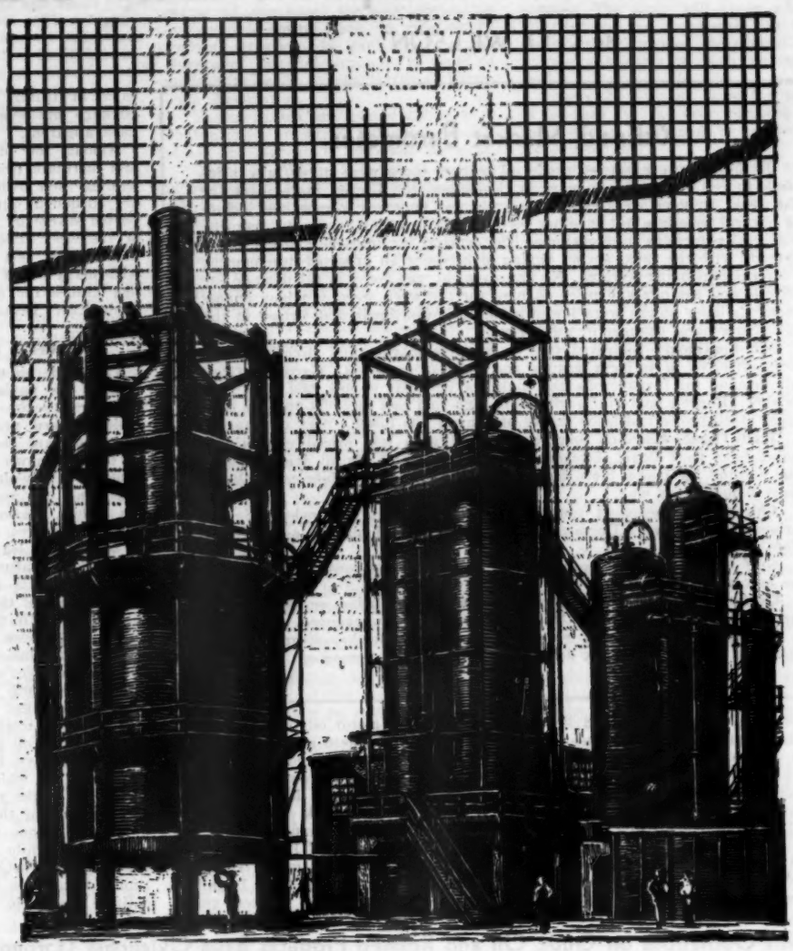
With that accomplished, similar determination on the part of the industry to exterminate tax evading racketeering will protect the gasoline and crude markets from that abuse.

The crude and gasoline divisions of the industry have each their problems which react on both. They can reach the common aim of stabilization only by joint effort. Neither can prosper permanently at the expense of the other.

The idea that losses in one division can be made up in another is unsound in principle. It indicates a loose screw in the industrial machinery that sooner or later may wreck it. Each operation should be profitable in itself if the whole industry is to advance permanently.

When the producer is prosperous the refiner prospers. The gasoline branch cannot build an enduring business when the producer is unable to make ends meet.

But working resolutely together they can solve their problems.



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Minor Advances in Oklahoma Gasoline Market as Trade Awaits Development in Crude

By C. O. WILLSON

The gasoline market in Oklahoma (Group 3) continued to show firmness rather than the usual weakness over the past week and prices on all grades are fractionally higher than they were a week ago. The low of the third grade U. S. Motor market has been advanced to 2¼ cents with one-eighth cent advance in other grades. A similar advance materialized in all grades of natural gasolines which have a strong position as regards supply and demand with spot material absorbed from day to day.

The advance in refinery gasolines materialized although there is little or no improvement in the spot demand coming from the northern markets. The expectation that the crude oil market is to be ironed out in the near future with higher posted prices is a factor in gasoline prices throughout the Mid-Continent, many refiners refusing to sell anticipating that spot quotations will improve within the next 10 days or two weeks.

Bright stock prices which started downward the first of the year were again reduced an additional one-fourth cent the first of the week following a general decrease last week. The 150-160 D, zero to 10, is now bringing 13½ cents f.o.b. Oklahoma refineries for domestic movement with prices down to 12½ cents for the 150-160 E. The recent declines are said to be due to the weakness in the Pennsylvania market. Mid-Continent refiners in both export and domestic markets state that it is necessary to maintain a certain price relationship to Pennsylvania bright stocks and when the latter weakens they have no choice but to lower their prices in line with the drop in the Eastern quotations. At the same time there are eastern refiners who maintain that low priced Mid-Continent material has taken certain markets from them and they are merely meeting rather than leading in the trend toward lower quotations. Regardless of the cause the result is an unsatisfactory bright stock market with current operations on the wrong side of the ledger for many manufacturers.

Some grades of neutral oils have also been reduced. It is pointed out that these lower prices for base lubricants not only mean less revenue for the manufacturers at their refineries but also tend to weaken the market for motor oils and other compounded oils. Refiners have been endeavoring to correct the price cutting tendency in the retail market for motor oils which has been brought about largely through the weakness in the tank car markets for stocks used in compounding these oils and in the latter part of 1932 it was felt that progress was being made. The sale of these finished oils in 1 to 10-gallon packages has materially reduced quart sales at filling stations. It is in this package business that price cutting is most apparent.

Among the other products, kerosene and distillate prices were no more than holding their own in the Oklahoma market although quality kerosene was reported scarce by several buyers the first of the week. There were minor changes in low cold test fuel oils and gas oils with many offers to sell in the high cold test grades the material coming largely from East Texas and the Texas Panhandle.

Crude Oil Situation

The crude oil situation to which most refiners are paying more attention than they are to the day-to-day market for their finished products did not develop any important changes during the week so far as known. The panoramic developments chronicled in the daily press consisting of injunction suits, restraining orders, testimony at hearings, new proration orders and suggested changes in state laws, leaves the average refiner very much confused as to whether any real progress is being made in solving the problems of the producing end of the oil business. Opinions of those in close touch with these developments vary as to their conclusions, some stating that the whole scheme of proration is gradually losing strength while others are equally confident that from present troubles will evolve a workable plan with proration of crude oil production as its basis which will give the industry a firmer foundation on which to operate over the remainder of the year. It is felt that before the end of the month there will be developments one way or the other and in the meanwhile a majority of the refining and marketing fraternity will continue to stand on the side lines with no definite trends in current markets.

Refined Market Barometer

Reflecting the unsettled crude oil market there were no definite price trends in refinery tank car markets throughout the United States over the past week. In some areas greater firmness was apparent in gasolines including natural gasolines but in other sections price cutting continued, pointing to general reductions in quotations. The demand for kerosene and distillates is steady with the usual spring buying of kerosene an expected development in several consuming sections. No improvement was noted in the demand for fuel oils and gas oils and price changes for the week were of minor importance. Cylinder stocks were lower in the Mid-Continent and firmer in the East. No general changes in wax prices.

Mid-Continent—Improved tone to gasoline market and slightly higher prices effective in refinery grades and natural gasolines. Kerosene firm. Fair demand for furnace oils and high gravity fuels of low cold test. Gas oils slow. Bargain material available in high cold test fuel oils and gas oils. Bright stock prices and some grades of neutral oils lower. Wax unchanged.

East Coast—Gasoline market unsettled with low priced competition coming from Gulf Coast shipments. Bunker fuel and gas oil demand slow. Good demand for Diesel fuels. Improvement in demand for lubricants. More export inquiries for wax.

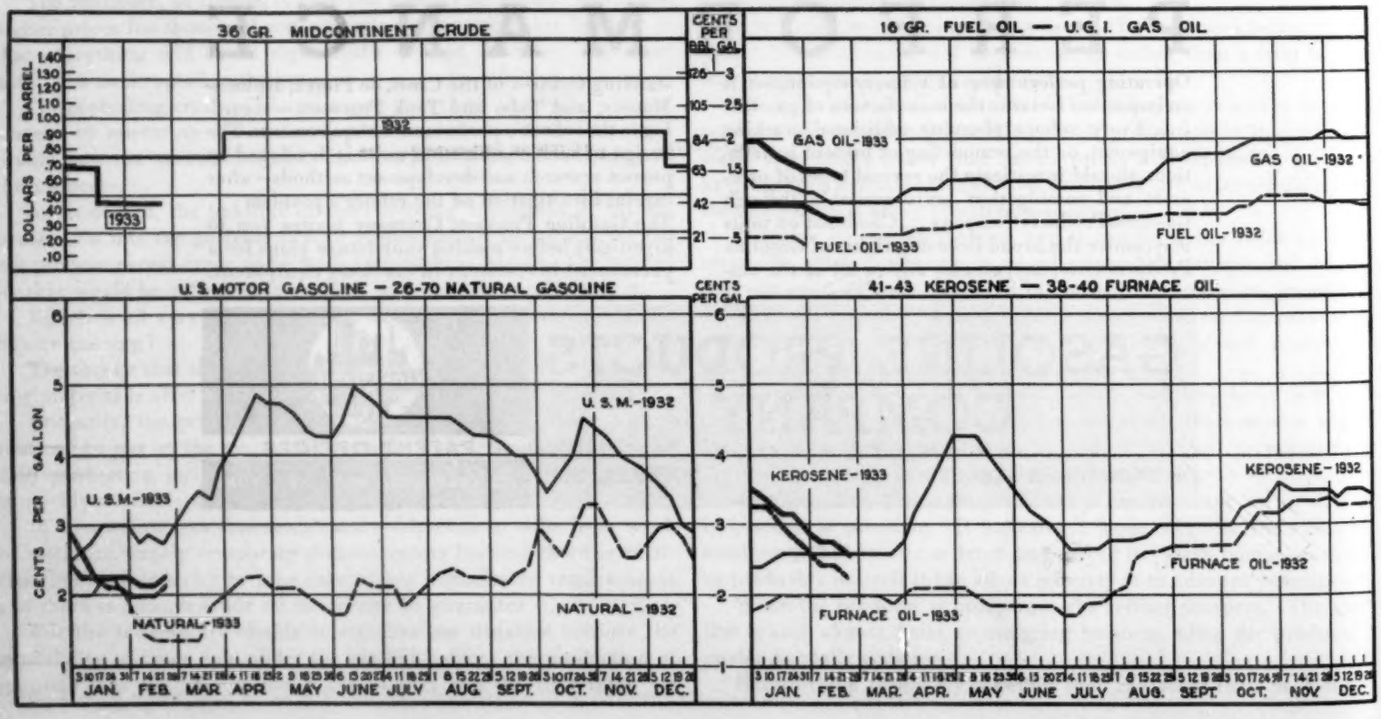
Chicago—Improvement noted in gasoline market and prices higher. Kerosene prices lower. Downward price trend in fuel oil, gas oil and distillate.

Gulf Coast—Markets marking time. Gas oil prices lower. Good coastwise movement in gasoline.

California—Gasoline market continues weak with prices on some grades lower. Natural gasoline prices lower. Other products unchanged.

Pennsylvania—Scattered reductions in bright stocks, steam refined stocks and neutral oils. Slow demand for gasoline and kerosene.

Representative Mid-Continent Quotations on Crude Oil and Refined Products Basis Oklahoma (Group 3)



It was frequently stated during the week by all classes of observers that the crude oil market was "tighter" in both Oklahoma and Texas. It was felt that this was contributing to whatever strength was apparent in the gasoline market. It was said that the tightness in the crude market was due to the decline in the availability of "hot" oil in the flush fields of the two states and also the increased purchases of several large and small buyers of crude oil who were willing to pay the present posted prices. At the same time, it was reported that in Oklahoma at least the willingness of some buyers to take on more crude oil was due to the fact that arrangements had been made to buy the crude under the present posted schedules of the major crude oil purchasers.

In the meantime, many refiners and crude buying agencies are receiving strong complaints from producers to the effect that present posted prices for crude oil are much below the cost of production and prices must be advanced. These complaints are most numerous from the old settled producing areas where production per well is usually under 10 bbls. daily per well. One refiner is reported to have replied facetiously to one of these complaints "we know exactly how you feel because we have operated our refinery at a loss over the greater part of the past two years," a statement which could be duplicated by most refiners throughout the Mid-Continent.

Regardless of the position of refiners at this time these complaints from producers are receiving recognition from major buyers and it is this fact that has led many to believe posted crude oil prices will shortly be advanced. Due to this fact many refiners are concerned as to what will be done so that the refinery tank car market can reflect these higher crude oil prices.

In this connection it is said that a plan to purchase excess gasoline in the Mid-Continent has strong sponsorship and will materialize when and if the higher crude oil prices are made effective. Market students from time to time over the past two years have pointed out the futility of endeavoring to maintain what is considered fair prices for Mid-Continent crude oil without some plan which would minimize the influence of the relatively small quantity of spot gasoline that is thrown on the market at distress prices, thus establishing market levels which are unsatisfactory to the refiners generally. This problem has been discussed so often that it seems there is hardly a new angle to be brought forth on which to base arguments either for or against perfecting an interrefinery buying plan which would minimize the market influence of this excess gasoline. It can be said, however, that those favoring such a program are as confident as they ever were, that any advances in crude oil prices will be temporary unless supported by a strong refinery market and the latter is only possible through the elimination of the market influence of small quantities of excess gasoline.

Changed conditions in oil marketing practices are said to make this gasoline buying plan more necessary in any plan to stabilize all oil markets at profitable levels than any previous period in the history of the Mid-Continent Field. It is pointed out that with all major refiners and most of the smaller refiners selling their gasoline output either through their own stations or on long time contracts with jobbers, the quantity of gasoline moving on the spot market from day to day has steadily decreased. With the present thin market, a few cars of gasoline dumped on the market to a large extent determines open market quotations including those published in daily and weekly publications which are the basis of practically all long time contracts. Thus the going market for the great bulk of motor fuel is determined by the sale of small quantities often in the hands of newcomers in the refining business who have no well established plan of carrying on refinery tank car sales.

Assuming that proration will be perfected through rigid enforcement so that the demoralising influence of crude oil sold under the posted prices will be eliminated, it is felt by sponsors that the buying plan can provide profitable outlets for this open market gasoline from week to week and thus place the entire gasoline market on a satisfactory basis. "If it is good policy for major interests to assume the responsibility of finding profitable markets for several hundred thousand barrels of Mid-Continent crude oil daily, why is it not equally expedient to provide outlets for a few thousand barrels of distress gasoline," was one executive's conclusion regarding the present situation in the Mid-Continent, "especially when we know that we cannot accomplish the former without providing for the latter."

Gasoline and Naphtha

The third grade U. S. Motor gasoline in Oklahoma advanced to a low of 2¼ cents the latter part of last week and that price continued in effect in sales to the trade the first two days of this week. The regular grade was available at a low of 2½ cents and the premium at 2¾ cents. Many East Texas, North Louisiana and Arkansas refiners have sufficient orders on their books to take care of their output until March 1. This has greatly reduced the quantity of gasoline offered in competition with Oklahoma and Kansas refiners in northern shipments.

The 60-62, 400 endpoint (third grade) is offered at a low of 2⅝ cents with prices on the lower endpoint material ranging up to 3 cents except in cases where some special octane rating is guaranteed.

Natural Gasolines

The 26-70 grade of natural gasoline was being sold in Texas and Oklahoma at 2⅛ cents the first of the week with a few scattered sales reported at 2¼ cents. Sellers generally were asking 2⅝ cents for 18-55 and the 15 and 11-pound material was slightly higher than last week.

The market continues to have inquiries

(Continued on Page 27)

Internal Revenue Department Replies to Questions Regarding Lub Oil Tax

By CHARLES E. KERN

WASHINGTON, D. C., Feb. 18.—The shipment, delivery and billing of lubricating oil, purchased for both lubricating and nonlubricating uses, in relation to Federal taxation, is explained by the Bureau of Internal Revenue, in reply to an inquiry made by the National Petroleum Association.

"The questions are quoted below with appropriate answers following each," states the Bureau of Internal Revenue.

"Query 1. 'Where a buyer is desirous of buying a quantity of either lubricating oil or gasoline in bulk and wishes to purchase part of it under an exemption certificate and to pay the tax on the remainder, can the two quantities be shipped in the same tank car?'

"Answer. Under the provisions of Paragraph 2 of Treasury Decision 4,339, 'lubricating oils' are all oils sold as such and all oils sold or used for lubrication. A particular oil having both lubricating and nonlubricating uses is taxable unless (1) it is put into a channel of consumption or distribution for use other than that of lubrication, under a name identifying it for such use, and (2) the manufacturer obtains from the purchaser a certificate to the effect that the oil will be used by him for a stated purpose other than that of lubrication or resold by him only to a person who in turn furnishes a similar certificate.

"Where a buyer is desirous of purchasing lubricating oil in bulk for both lubricating and nonlubricating purposes, that portion of the oil which is to be used for a nonlubricating purpose may be purchased from the manufacturer or producer of lubricating oils tax free upon presenting him at the time of purchase with a certificate as outlined above for that part of the oil which is to be used, and actually is used, for a nonlubricating purpose. The same will apply where lubricating oil is purchased for further manufacture provided the exemption certificate applicable to such purchases is used.

"Query 2. 'Can he store the material to be used for the two purposes in the same storage tank when he received it at its destination?'

"Answer. If accurate records are kept showing the actual distribution of the oil purchased tax free under Treasury Decision 4,339 for nonlubricating purposes and that purchased tax free under Section 620 for use as component material in the manufacture of other taxable articles and that purchased for resale purposes and such oil is so distributed or used, then it will not be necessary for such oil to be kept in separate containers while being stored awaiting such distribution or use.

"Query 3. 'If a sale can be handled in this manner, will it be necessary to secure a separate order for the material to be shipped tax free and a separate order for the material upon which the tax is paid; also, will it be advisable that acknowledgments of orders and invoices to the purchaser correspond with the original order?'

"Answer. Separate orders should be obtained for the sale of lubricating oil both for lubricating purposes and for nonlubricating purposes. It is advisable that all records correspond with the original order. In the event that separate orders for both oils are not made, then the single order must identify and state specifically the quantities of oil covered thereby for each of the specific uses."

American Petroleum Institute Weekly Refinery Statistics

Figures below reported for week by American Petroleum Institute. (1) Per cent refinery capacity represented. (2) Daily average crude runs to stills. (3) Total motor fuel stocks. (4) Gas oil and fuel oil stocks. All figures in 42-gallon barrels.

Week Ending February 18, 1933, Compared to Week Ago

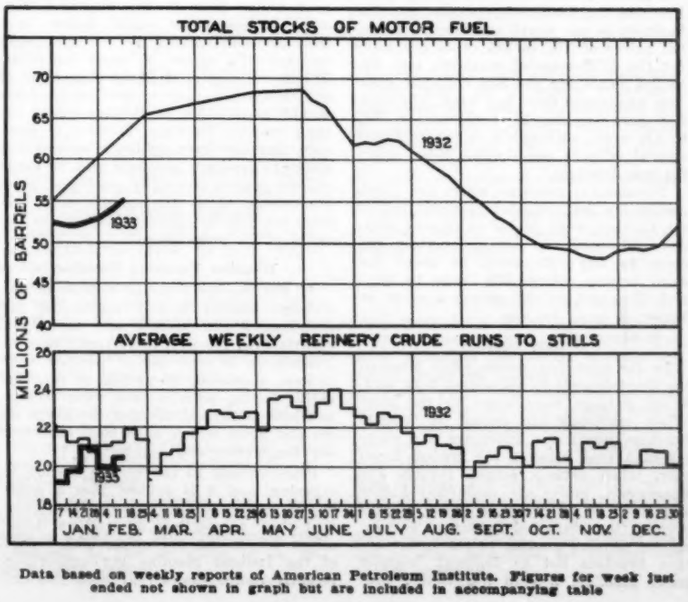
	Week ending February 18, 1933				Week Ending February 11, 1933			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
East Coast	99.1	440,000	14,234,000	7,191,000	99 1	439.000	14,096.000	7,495,000
Appalachian	95.0	81,000	1,954,000	902,000	95.0	74,000	1,947,000	898,000
Ind., Ill., Ky.	97.5	294,000	7,762,000	3,085,000	97 5	275.000	7,529,000	3,164,000
Okla., Kans., Mo.	84.9	209,000	5,063.000	2,786,000	84.9	193,000	4,978.000	2,982,000
Inland Texas	56.4	82,000	1,549.000	2,135,000	56 4	75,000	1,541,000	2,154.000
Tex. Gulf	97.7	411,000	6,339,000	6,756,000	97 7	434,000	6,457,000	6,674,000
La. Gulf	97.3	86,000	1,491,000	2,133,000	97.3	83.000	1,421,000	2,271,000
N. La. and Ark.	88.5	54,000	330,000	620,000	85 5	53,000	292,000	871,000
Rocky Mtn.	90.8	31,000	1,413,000	567,000	90 8	26,000	1,362,000	643,000
California	94.6	384,000	15,326,000	99,135,000	94.6	383,000	15,419,000	99,064,000
Total U. S.	91.6	2,072,000	55,461,000	125,310,000	91.6	2,045,000	55,042,000	125,816,000

Total motor fuel stocks, Bureau of Mines basis, 56,560,000 bbls.

Week Ending February 18, 1933, Compared to Year Ago

	Week ending February 18, 1933				Week Ending February 20, 1932			
	(1)	(2)	(3)	(4)	(1)	(2)	(*3)	(4)
East Coast	99.1	440,000	14,234,000	7,191,000	100 0	448,000	5,923,000	6,881,000
Appalachian	95.0	81,000	1,954,000	902,000	91.8	92,300	1,718,000	1,183,000
Ind., Ill., Ky.	97.5	294,000	7,762,000	3,085,000	98.9	279,700	5,448,000	4,756,000
Okla., Kans., Mo.	84.9	209,000	5,063,000	2,786,000	89 6	220,700	3,877,000	3,351,000
Inland Texas	56.4	82,000	1,549,000	2,135,000	....	134,700	1,900,000	2,814,000
Tex. Gulf	97.7	411,000	6,339,000	6,756,000	99.8	381,600	7,300,000	7,606,000
La. Gulf	97.3	86,000	1,491,000	2,133,000	100 0	113,900	1,305,000	3,133,000
N. La. and Ark.	88.5	54,000	330,000	620,000	....	38,200	155,000	787,000
Rocky Mtn.	90.8	31,000	1,413,000	567,000	89 4	37,400	2,007,000	702,000
California	94.6	384,000	15,326,000	99,135,000	97 1	453,900	14,159,000	95,991,000
Total U. S.	91.6	2,072,000	55,461,000	125,310,000	95.2	2,190,400	43,792,000	127,209,000

*Refinery stocks only.



Data based on weekly reports of American Petroleum Institute. Figures for week just ended not shown in graph but are included in accompanying table

Gasoline Tank Car Market in Chicago Stronger With Better Feeling Regarding Crude Oil

By R. C. CONINE
Chicago Bureau, The Oil and Gas Journal

CHICAGO, Feb. 20.—With less gasoline pressing on the tank car markets, and because of considerably better feeling in the crude oil situation, gasoline tank car markets in the Chicago district advanced pricewise although buying activity Monday showed only slight improvement. The milder turn in the weather is welcomed in district oil trade circles, in spite of the fact that higher temperatures have affected the distillate and fuel oil markets adversely. It was evident during the subzero cold spell that buyers had little confidence in the distillate and fuel oil markets, and governed their participation in the markets accordingly. There is more to look forward to in the gasoline tank car markets, however, and the belief is growing that there will be little difficulty in maintaining still higher price schedules in the tank wagon markets as well as the tank car gasoline markets.

The new freight schedule which places distillate rates in the fuel oil class when the distillate is unsuitable for illuminating oil purposes, anticipated in The Oil and Gas Journal some time ago, will go into effect March 15, according to the recently issued tariff supplement of the Interstate Commerce Commission. Because distillate (38-40) moved on the gasoline rate, 2.44 cents from Group 3, to Chicago, and the "gas oil" (32-36) moved on the fuel oil rate, 2.44 cents, certain published price sources have quoted the distillate at a quarter of a cent under the gas oil materials, rather than naming identical price ranges. This is the consideration which has governed price quotations rather than any advantage in statistical position.

High Test Gasolines

The high test gasolines are having to compete with stabilized natural gasolines and in so far as the Chicago district is concerned, the 64-66 375 endpoint gasoline and the 68-70 300 endpoint gasoline business is not worth considering. Nominal prices of 2¾ to 2⅞ cents are made for the 375 endpoint material, and 3⅛ to 3¼ cents for the 300 endpoint gasoline, unchanged from last week. The aviation grade is likewise unchanged at 3⅜ to 3⅝ cents, although it is reported that several refiners are shading these prices for new business.

The natural gasolines which are shouldering the low endpoint gasolines out of the markets were quoted as follows Monday: 18-pound, 70 octane number, 2⅝ cents to buy; 15-pound, of about the same octane rating, 2⅛ cents to buy, and 11-pound, of 65 octane number or better, 3 cents to buy.

Octane Ratings

In the past few weeks some interesting developments in connection with antiknock ratings have come to the fore. When materials are quoted in "octane brackets" there is a difference of a quarter of a cent between the grades. However, when certain octane ratings are guaranteed, prices are somewhat higher and there is, naturally, a wider margin between the bracketed materials. For instance, refiners quoting prices in the octane brackets list as follows: Regular grade gasoline, 2½ to 2¾ cents; premium grade gasoline, 2⅞ to 3 cents; third grade gasoline, 2⅝ to 2½ cents. Refiners guaranteeing certain octane ratings quote prices as follows: 57 octane, 2⅝ to 2½ cents; 60 octane, 2½ cents; 65 octane, 2¾ cents, and 70 octane 3 to 3⅛ cents. The 60 octane price is the low of the regular grade range, while the 65 octane material is a quarter of a cent above the low of the regular grade, and the 70 octane gasoline is an eighth of a cent above the low of the premium grade gasoline. Monday's prices quoted above represent advances of a quarter of a cent over prices last week. The other materials showed advances of an eighth of a cent or remained stationary.

Prices quoted on the 60-62 400 endpoint gasolines Monday were as follows: No octane specifications, 2⅝ to 2⅝ cents; 57-64 octane bracket material, 2¾ to 2⅞ cents; 65 octane bracket material, 2⅞ to 3 cents, and 70 octane bracket gasoline, 3⅛ to 3¼ cents.

In view of the fact that most of the U. S. Motor classified material sold in the Chicago district is 60-62 gravity gasoline with endpoint ranging from 410 to 420, the 60-62 400 endpoint gasoline offers little advantage, and few jobbers will pay the extra eighth of a cent or so. The narrower differential among the different octane brackets is in a large measure seasonal. Late in the spring and during the summer and early fall months the spread is expected to widen.

There appears to be little concrete information in connection with the progress of certain refiners in their efforts to have the Ethyl gasoline antiknock requirements lowered. The lowering of the octane rating of the premium gasoline from 78 to about 74, is contingent, naturally, upon the adoption of the C.F.R. Motor method in place of the method now known as the C.F.R. Research method which gives higher test values.

Important Contract Development

For some time three of the larger independent oil companies have been offering certain of their larger accounts discounts of three-eighths of a cent under the low of published daily quotations in the gasoline tank car markets. For several weeks now it has appeared that other independents would follow suit. The three companies, as a result, have widened the scope of their activities. Monday it appeared likely that most of the semimajors and smaller independents would adopt this marketing policy on their contract business. While it is probable that the three-eighths of a cent discount to contract accounts will be made off the low of the daily published price quotations, there are reports that this discount may be standardized on the average of the price range.

Weather Favoring Gasoline

If the increased motor traffic in the Chicago district is any indication, the distributors and jobbers who have been experiencing the first important slump in business in a year due to weather conditions, should be preparing to take an active buying position this week. Warm sunshine is rapidly melting the heaps of ice and snow which have been obstructing the streets and highways.

Price cutting at the service station is tapering, and it is evident that a number of marketers are beginning to realize that their competitors as well as themselves are losing gallonage. The report of the Indiana gasoline tax authorities recently issued shows that with two exceptions, these being newcomers, all of the important gasoline marketing companies lost considerable gallonage in that State in 1932. It is therefore clear that losses sustained by one marketer did not represent gains made by a competitor, as had apparently been thought. If the difficulties connected with the general trend toward taking contract business on a basis of three-eighths of a cent under the low of daily published price quotations are ironed out, there is every indication that better relations are in store among the various companies. Effort to harmonize conflicting policies is particularly important in view of the fact that additional important competition is preparing to enter the field, particularly in Kansas, as pointed out by C. O. Willson in a recent article.

New Majors Entering Market

Two major companies, Gulf and Tide Water, are reported making good headway in the new fields of southern Illinois, Indiana and Ohio. There has been a keen competitive situation in these territories for nearly a year, and some of the companies are combating the less representative companies in the areas by making price cuts in the areas where those companies have their largest markets. These measures probably account for some of the adverse developments in the Eastern markets. The special naphtha tank car markets are likewise reflecting the entrance of newcomers in the field, particularly in Ohio.

Special Naphtha Tank Car Markets

The special naphtha tank car markets, although they are said to bear little relationship to the gasoline tank car markets, are waiting for an additional advance of an eighth of a cent in the gasoline markets before moving up a quarter of a cent. Special naphtha business has been slow for the past two weeks, particularly for those producers who are holding to the high of the price brackets shown on the Tank Car Market page of The Oil and Gas Journal. Several refiners in the Mid-Continent are out looking for their first special naphtha business, particularly in the Stoddard solvent and light cleaners' grades (or V.M.&P. and petroleum thinner). Prices quoted by these companies are usually a cent under the going spot markets as quoted by the older naphtha marketers. Certain of these refiners explain their low prices by saying that they are gauging the actual markets to ascertain going prices, others of this group state frankly that the low prices are part of their introductory proposition.

Kerosene Tank Car Markets

The kerosene tank car markets moved down this week in sympathy with the weaker distillate and gas oil markets. Distributors reported some interest in kerosenes, but the estimate appears to be comparative as little material is moving through the Chicago district operators. The 41-43 water white kerosene moved down from a range of 2⅝ to 2¾ cents to a range of 2½ to 2⅝ cents, and the 42-44 water white kerosene moved down from a range of 2¾ to 2⅞ cents to a range of 2⅝ to 2¾ cents.

Distillates, Gas Oils, Fuel Oils

All of the distillates, gas oils and fuel oils, with one exception, moved down this week, principally due to mild weather conditions and because of low industrial activity. In the Chicago district there has been considerable talk of a lower price on the 38-40 distillate than on the 32-36 zero material classed as special gas oil. However, the 0.22-cent freight advantage is not surrendered easily by the buyer seeking the lower gravity material, so that as far as this district is concerned the buying will be in 38-40 straw and prime white zeros rather than in gas oils where the price of the 32-36 material does not share part of the freight differential with the buyer. In the matter of the 38-40 light straw distillate, or No. 1, burning oil, the abundance of this material as compared with the 32-36 gas oil is not discernible. In fact, a number of samples of so-called No. 1, oil have been gathered and tested and these materials are far from being light straw in color, 155° F. or so flash, etc. They give the appearance of being fuel oils brought up by the addition of kerosene.

If the expected advance in the crude oil markets materializes extended cracking and reforming operations will probably better the statistical position of the heavy naphthas, kerosenes, distillates and fuel oils. Indirectly the improved crude oil markets will give the refined products markets the firm footing which has been lacking since the raw product markets crashed. The fact is that in the Chicago district oil trade circles there is new confidence that the crude oil situation will be straightened out and that the elements which have made proration a burden will be eliminated when investigations are completed in Texas and Oklahoma.

The 32-36 straw zero distillate (or gas oil), the 38-40 light straw zero, and the 38-40 prime white distillate, moved down an eighth of a cent from last week's low, while the highs were a quarter of a cent under the previous highs. Prices on these materials are identical in the narrower range of 2⅜ to 2½ cents.

The 32-36 industrial dark gas oil moved down a qaurter of a cent to a range of 1⅝ to 1⅝ cents; the 28-30 zero fuel oil Monday was quoted at 90 to 95 cents a barrel, a drop of 5 cents a barrel. The 26-28 zero fuel oil declined similarly to a range of 75 to 80 cents a barrel, and the 22-26 zero fuel oil moved down 5 cents to a range of 60 to 65 cents a barrel. A smaller loss was registered in the 18-22 zero material which moved down from a range of 52½ to 57½ cents to a range of 50 to 55 cents. The below 18 gravity material was unchanged Monday at 45 to 50 cents a barrel.

Prices for the Chicago switching district remain unchanged and are as follows, basis Group 3 (Empire Oil & Refining Co.): 18 gravity, 200 flash, zero of 200 @ 100 vis., 52½ cents a barrel; 16 gravity, 225-240 flash, zero of 300 @ 100 vis., 50 cents a barrel; 10-11 gravity, 225-40 flash, 200 @ 100 vis., 47½ cents a barrel. Petroleum coke prices are unchanged at $4.50 for breeze and screenings; $5.50 for still runs, and $6.50 for lump and egg.

FUEL OIL TAX ULTRA VIRES

CHATHAM, Ontario, Feb. 18.—In a test case, Chief Justice Aulay Morrison of British Columbia has held that the Fuel Oil Tax Act, passed by the British Columbia legislature in 1930, is ultra vires, on the ground that it imposes an excise tax. The test case, in which the attorney general of Birish Columbia claimed $3,900 from the Kingscomb Navigation Co., Ltd., was dismissed with costs. The act sought to impose a tax of one-half cent a gallon on fuel oil.

Gasoline Lower in New England as Tank Wagon Market Position Still Remains Demoralized

By A. E. MOCKLER
New York Bureau, The Oil and Gas Journal

NEW YORK, Feb. 20.—With price cutting in retail gasoline continuing to make for demoralized market conditions in many sections of the East Coast territory, general reductions in tank wagon and service station prices at numerous points in New England were put into effect during the week. The refinery gasoline position remained unchanged, although an undercurrent of easiness was evident. Marketing of third grades at steadily falling retail prices remains the feature of the metropolitan area, while in other points marketers are succeeding in further reducing their netbacks by virtually unrestricted competition for commercial accounts. Some marketers are reported to be going far beyond the openly announced commercial discounts in their endeavor to increase their gallonage.

Refinery Markets

Major interests continue to post U. S. Motor at 5½ cents and gasoline of 65 octane number and above at 5¾ cents, tank car lots, f.o.b. refineries and terminals at principal East Coast distributing points. Sellers are freely shading these prices and 5 cents for U. S. Motor and 5¼ cents for the higher test product are not uncommon in current spot sales. Distributors are still out of the market for forward deliveries, and are combing the market when making spot purchases.

Cheap gasoline from the Gulf Coast continues a factor, and several cargoes for shipment to North Atlantic ports were reported closed during the week at laid-down prices well under posted quotations here.

Tank Wagon Gasoline

Effective February 15, a number of reductions in tank wagon and service station gasoline prices were made by Standard Oil Co. of New York, Inc., and other marketers in this territory. Revised prices are as follows: Albany, tank wagon 14 cents, service station 15 cents, off 1 cent in each instance; Buffalo, 12½ cents for both tank wagon and service station, off 2½ cents on tank wagon and 3½ cents on service station; Rochester, 1 cent lower at 14½ cents tank wagon and 15½ cents service station; Augusta, Me., one-half cent lower at 17 cents tank wagon and 18 cents service station; Manchester, N. H., 1 cent lower at 16½ cents tank wagon and 17½ cents service station; Burlington, Vt., 1 cent lower at 17 cents and 18 cents, respectively. No change was made in New York City, where 13½ cents per gallon is posted for both tank wagon and service station deliveries.

Third grade gasoline marketing at cut prices continues unabated in metropolitan New York. Although the average retail price is 10 gallons for $1, isolated instances of postings of 12 gallons for $1 are reported. This latter price yields an extremely low netback, when the tax of 4 cents and the dealer's margin of 2 cents are deducted. All of the major marketers are now distributing third grades, and this product has now attained the widest distribution ever seen in this market.

Not content with fighting one another "tooth and nail" with their third grade products, a number of the major distributors have apparently arrived at the idea that a heavy commercial gallonage, regardless of price, is quite desirable, and in the rush for additional commercial contracts, existing discount schedules are being ruthlessly slashed in many cases. Instances have been reported of discounts of 4½ cents under posted prices for commercial accounts.

Executives of major companies are seriously concerned and it is expected sales departments will soon be ordered to call a halt.

Kerosene

The refinery market is showing definite signs of weakness, and business is going through in many instances at 5¼ cents for 41-43 water white in tank car lots, although the posted price remains at 5½ cents. Kerosene sales today return a much greater margin of profit than gasoline.

Bunker Oil

Bunker oil circles were interested in reports that a change in marketing practices was imminent, but at the last moment the companies planning such changes, which were to have taken the form of the elimination of all concessions, changed their plans. Consequently, the market for bunker "C" oil remained in quiet position, with sellers posting 75 cents per barrel, bulk, at terminals, at principal East Coast bunkering ports. Gallonage was reported holding up well.

Intercoastal lines operating between New York and other East Coast ports and California are doing most of their bunkering at San Pedro, where bunker "C" oil is available at 45 cents per barrel, 30 cents under the East Coast basis.

Furnace Oil

There were no price changes reported in the furnace oil market, and refinery shipments continued large, demand being stimulated by the record cold weather.

Tank wagon heating oil prices were also unchanged so far as posted quotations are concerned. Some price competition continued on the heavier grades, but oils for domestic burners were going out on the posted basis in most instances.

Gas Oil

Spot market conditions showed little change and sellers continued to quote 3¾ to 4 cents for 28 gravity minimum oil in tank car lots, f.o.b. terminals. Gas manufacturing companies were reported to be drawing oil against contract in larger volume, and the demand for delivery against domestic heating oil contracts was also well maintained.

Stocks of gas and fuel oils held at East Coast refineries again declined during the week ended February 11, totaling 7,495,000 bbls. on that date, compared with 7,537,000 bbls. at the close of the previous week.

Diesel Oil

Refiners reported a well sustained demand for Diesel oil and the market continued steady at $1.65 per barrel, bulk, f.o.b. principal East Coast terminals.

Wax

Export inquiry for paraffin wax was a little more active locally with both crude scale and fully refined grades being inquired for. Buyers were seeking concessions beyond the point at which most refiners were willing to sell and the amount of actual business booked was limited.

Routine activity was reported in petrolatums during the week, with prices holding unchanged.

Lubs

A slight improvement in export demand made for a better tone in the cylinder oil market and while quotations were unchanged the market position appeared improved. Distressed lots of cylinder oils, which have weakened the market throughout the past month, appear to have been well liquidated, and sellers now are holding firm at quoted levels. More inquiry is reaching the market from Europe, and an early buying movement of substantial volume is looked for.

Quotations for red and pale oils were again without change, with trading limited to small quantities for prompt and nearby shipment.

Exports and Imports of Refined Products, Receipts of California Oils in the East

NEW YORK, Feb. 20.—Gulf export markets were enlivened last week by the entry of Soviet and Japanese buyers into the picture, for casinghead gasoline and crude and fuel oils, respectively. Japanese interests in Gulf offerings, previously reported in these columns, culminated in the closing of a cargo of some 105,000 bbls. of crude petroleum, at a reported price of 74 cents per barrel, f.o.b., for March loading, and a cargo of slightly over 100,000 bbls. of fuel oil, at a reported price of 42 cents per barrel, also for March loading. Additional Japanese inquiries were reported in the market, although it was considered possible that this business might go back to California.

A cargo of 64,000 bbls. of 64-66 gasoline was reported booked for France at 3¾ cents, f.o.b. Gulf port, for late February-early March loading. An inquiry was in the market for a cargo of 16,000 bbls. of kerosene and 32,000 bbls. of 64-66 gasoline for late March shipment to France. One cargo of East Texas crude was loading for France last week at 72 cents per barrel, the market having eased off 2 cents per barrel following the sale to Japan at 74 cents. Other cargo inquiries were pending in the crude oil market.

Exporters were quoting export prices at the Gulf as follows: U. S. Motor, 3¼ cents; 60-62 400 endpoint and 61-63 390 endpoint, 3½ to 3⅝ cents; 64-66 375 endpoint, 3¾ cents; kerosene, prime white, 4 cents; water white, 4⅛ to 4¼ cents.

A cargo of approximately 80,000 bbls. of 64-66 was reported booked during the week, for April-May loading for France at 3¾ cents, but this sale could not be confirmed.

Considerable irregularity has developed in the market for Venezuelan crude, with one major factor quoting 58 cents per barrel and another offering at 48 cents. The low seller, however, was not quoting for shipment to Europe, this reservation being attributed to a desire to protect the U. S. Gulf market.

A cargo of 88,000 bbls. of Peruvian crude was reported sold during the week, for shipment to France or Germany, but details and price were not available.

California Oil Receipts

Receipts of California crude and refined petroleum at Atlantic Coast ports during the week ended February 11 (there were no receipts of California petroleum at Gulf Coast ports during the period) totaled 160,000 bbls., a daily average of 22,857 bbls., compared with 516,000 bbls., a daily average of 73,714 bbls., for the previous week, and a daily average of 43,607 bbls. for the four weeks ended February 11. The week's cargoes landed were as follows: Baltimore, 40,000 bbls.; Boston, 46,000 bbls.; other ports, 74,000 bbls., and consisted of 120,000 bbls. of kerosene and 40,000 bbls. of fuel oil.

At the close of the week the following tankers were reported afloat for East Coast ports with California petroleum:

For New York—45,000 bbls. of gas oil on the Standard Shipping Co. tanker Cerro Ebano; 95,700 bbls. of fuel oil in the Socony-Vacuum tanker Java Arrow; 95,000 bbls. of fuel oil on the Socony-Vacuum tanker Yankee Arrow, and 117,000 bbls. of gasoline on the Sun Oil Co. tanker Northern Sun.

Imports

(Barrels of 42 gallons)

At Atlantic Coast ports—	
Baltimore	67,000
Boston	134,000
New York	743,000
Total	944,000
Daily average	134,857
At Gulf Coast ports—	
Port Arthur	66,000
Daily average	9,429
At all United States ports—	
Total	1,010,000
Daily average	144,286
Daily average four weeks	144,179

The week's imports comprised 509,000 bbls. of crude and 501,000 bbls. of fuel oil.

Petroleum Exports

The following table shows exports of principal refined petroleum products from the port of New York reported during the three weeks ended February 11 (all figures in gallons unless otherwise noted):

	Week ended		
	Feb. 11	Feb. 4	Jan. 28
Gasoline	205,000	85,000	348,000
Naphtha	525,000	380,000	.....
Kerosene	5,000	389,000	16,000
Fuel and gas oil	52,000	1,370,000	5,000
Lub. oil	998,000	4,022,000	1,925,000
Pet., refined	318,000	515,000	560,000
	Pounds		
Petrolatum	2,000	.....	5,000
Paraffin wax	7,475,000	2,925,000	2,590,000
Refined	25,000	.....	95,000
Scale	60,000	115,000	570,000
Lub. grease	1,445,000	895,000	1,075,000

Export Tanker Fixtures

Motorship Athel (Br.), 13,000 tons, fuel oil, Gulf to Japan, 32 cents, March loading.

Steamer Gustaf E. Reuter (Swed.), 3,449 tons net, refined products, Gulf to France, 8s. 9d., March loading.

Motorship Athel (Br.), 11,000 tons, crude, Peru to the Bordeaux-Hamburg range, 15s., March loading.

Motorship Noreg (Nor.), 4,504 tons net, crude, Gulf to Port de Bouc, 8s. 6d., March loading.

Steamer Vaarli (Nor.), 8,500 tons, crude, Gulf to U.K./Continent, 8s. 6d., February loading.

Motorship G. C. Brovig (Nor.), 5,860 tons net, was reported fixed for the movement of a cargo of Venesuelan crude from Venesuela to Port de Bouc, at 7s. 6d., for prompt loading.

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement except as otherwise noted

EXCLUSIVE OF TAXES

The following quotations are exclusive of the Federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils, which became effective June 21, 1932.

Refinery Gasolines

	Feb. 21		Feb. 14	
OKLAHOMA (Group 3)—				
*U. S. Motor grades:				
Regular	.02½	.02⅝	.02⅝	.02⅝
Premium	.02⅝	.03	.02⅝	.02⅞
Third grade	.02¼	.02⅝	.02⅛	.02⅝
60-62 400 grades:				
Regular	.02⅝		.02¼	.02⅝
Premium	.02⅞		.02⅝	.03
Third grade	.02⅝		.02¼	.02⅜
64-66 390	.02½	.02⅝	.02⅝	.02⅝
64-66 375	.02¾	.03	.02⅝	.02⅞
68-70 350	.03	.03⅛	.02⅞	.03⅛
NORTH TEXAS—				
U. S. Motor grades:				
Regular	.02⅜	.02½	.02⅜	.02½
Premium	.02⅝	.02⅞	.02⅝	.02⅞
Third grade	.02⅛	.02¼	.02¼	.02¼
60-62 400	.02¼	.02½	.02¼	.02½
64-66 390	.02⅜	.02½	.02⅜	.02½
64-66 375	.02⅝	.02⅞	.02⅝	.02⅞
64-66 360	.02⅞	.03⅛	.02⅞	.03⅛
†NORTH LOUISIANA—				
U. S. Motor grades:				
Regular	.02⅞	.03	.02⅝	.02¾
Premium	.03⅛	.03¼	.02⅞	.03
Third grade	.02½	.02¾	.02⅝	.02½
60-62 400	.02⅝	.02¾	.02⅝	.02¾
†ARKANSAS—				
U. S. Motor grades:				
Regular	.02⅞	.03	.02⅝	.02¾
Premium	.03½	.03¼	.02⅞	.03
Third grade	.02½	.02¾	.02⅝	.02½
CHICAGO (Based on Oklahoma Group 3)—				
U. S. Motor grades:				
Regular	.02⅝	.02¾	.02⅜	.02⅝
Premium	.02⅞	.03	.02⅝	.02⅞
Third grade	.02⅜	.02½	.02½	.02⅜
60-62 400	.02⅜	.02⅝	.02¼	.02½
64-66 375	.02½	.02⅞	.02⅝	.02¾
68-70 360	.03⅛	.03¼	.03⅛	.03¼
Aviation fighting grade	.03⅜	.03⅝	.03⅜	.03⅝

*Octane Ratings—The following octane ratings apply to the three grades of U. S. Motor gasoline: Regular, 57-65 octane number; premium, above 65 octane number; third grade, below 57 octane number.

†For Arkansas, Louisiana and Mississippi delivery.

PENNSYLVANIA (inland refineries)—				
U. S. Motor	.04⅝	.04¾	.04⅝	.04¾
60-62 400	.04¾	.05	.04¾	.05
64-66 375	.05	.05½	.05	.05½
68-70 350	.05¼	.05½	.05¼	.05½
CALIFORNIA (domestic movement only)—				
54-58 U. S. Motor	.04½	.05½	.04¾	.05½
58-60 400	.05¼	.05½	.05¾	.06¾
EAST COAST—				
U. S. Motor, below 65 octane:				
New York (Bayonne)	.05½		.05½	
Boston	.05½		.05½	
Baltimore, Md.	.05½		.05½	
Charleston, S. C.	.05½		.05½	
U. S. Motor, 65 octane and above:				
New York (Bayonne)	.05¾		.05¾	
Boston	.05¾		.05¾	
Baltimore, Md.	.05¾		.05¾	
Charleston, S. C.	.05¾		.05¾	
GULF COAST (domestic)—				
U. S. Motor, 65 octane and above	.03¾	.04	.03¾	.04
U. S. Motor, below 65 octane number	.03	.03¼	.03	.03¼

Naphthas

	Feb. 21		Feb. 14	
OKLAHOMA (Group 3)—				
50-52 450 (blending)	.02	.02¼	.02	.02¼
PENNSYLVANIA (inland refineries)—				
50-54 430-450 (blending)	.04⅜	.04⅝	.04⅜	.04⅝
ARKANSAS—				
48-50 450 (blending)	.02½	.02¾	.02½	.02¾
CHICAGO (Based on Oklahoma Group 3)—				
50-52 (blending)	.02⅛	.02⅜	.02⅛	.02⅜
Cleaners' naphtha, 56-58 gr., 200 i.b.p.-320 e.p.	.05½	.05¾	.05½	.05¾
Lacquer diluent, 180 i.b.p.-250 e.p.	.06¾	.07	.06¾	.07
Lacquer diluent, 140 i.b.p.-200 e.p.	.08½		.08½	
Rubber solvent, 68-70 gr., 100 i.b.p.-300 e.p.	.05½	.05¾	.05½	.05¾
Stoddard solvent, 300 i.b.p.-410 e.p., over 100° flash	.05	.05¼	.05	.05¼
Pet. thinner, 290, 300 i.b.p.-415 e.p., over 83° flash	.04¼	.04½	.04¼	.04½
V.M.&P. naphtha, 56-58 gr., 190-200 i.b.p.-330 e.p.	.05¼	.05½	.05¼	.05½
Petroleum spirits	.04	.04¼	.04	.04¼

Natural Gasolines

	Feb. 21		Feb. 14	
OKLAHOMA (Group 3)—				
Grade 18-55	.02⅝		.02½	
Grade 26-70	.02⅛		.02	
Grade 30-70	.02		.01⅞	
*Low pressure grades:				
15 lb. v.p. (max.)	.02¾		.02⅝	.02¾
11 lb. v.p. (max.)	.02⅞	.03	.02¾	.02⅞
NORTH TEXAS—				
Grade 18-55	.02½	.02⅝	.02⅜	.02½
Grade 26-70	.02⅞		.02	
Grade 30-70	.02		.01⅞	
*Low vapor pressure grades:				
15 lb. v.p. (max.)	.02¾		.02⅝	
11 lb. v.p. (max.)	.02⅞		.02¾	
NORTH LOUISIANA—				
Grade 26-70	.02⅜	.02½	.02¼	.02⅜
CALIFORNIA—				
75-78 375	.03¾	.04½	.04¼	.05¼

Kerosenes

(All kerosenes water white)

	Feb. 21		Feb. 14	
OKLAHOMA (Group 3)—				
41-43	.02⅝	.02¾	.02¾	.03
42-44	.02¾	.03	.02⅞	.03⅛
NORTH TEXAS—				
40-41	.02⅜	.02½	.02⅝	
41-43	.02½	.02⅝	.02⅝	.02¾
†NORTH LOUISIANA—				
41-43	.03½		.03½	
42-44	.03⅝		.03⅝	.03¾
†ARKANSAS—				
41-43	.03½	.03¾	.03½	
PENNSYLVANIA (inland refineries)—				
45	.04½	.04¾	.04½	.04¾
46	.04½	.04¾	.04½	.04¾
47	.04¾	.05	.04¾	.05
CHICAGO (Based on Oklahoma Group 3)—				
41-43	.02½	.02⅝	.02⅝	.02¾
42-44	.02⅝	.02¾	.02¾	.02⅞
*CALIFORNIA—				
38-40 high burning test	.03½	.04½	.03½	.04½
NEW YORK (Bayonne, N. J.)—				
41-43	.05¼	.05½	.05½	
GULF COAST (domestic)—				
41-43 water white	.04¼	.04½	.04¼	.04½

*For Pacific Coast Consumption.

†For Arkansas, Louisiana and Mississippi delivery.

Furnace Oils and Tractor Fuels

	Feb. 21		Feb. 14	
OKLAHOMA (Group 3)—				
32-36 straw	.02⅝	.02½	.02½	.02⅝
36-38 straw	.02¼	.02½	.02⅝	.02⅝
38-40 straw	.02¼	.02½	.02⅜	.02⅝
39-41 prime	.02⅜	.02⅝	.02⅜	.02⅝
NORTH TEXAS—				
38-40 straw	.02¼	.02½	.02¼	.02½
†NORTH LOUISIANA—				
36-40	.02¾	.03	.02¾	.03
†ARKANSAS—				
32-36	.02⅝	.02¾	.02¾	.03
CHICAGO (Based on Oklahoma Group 3)—				
32-36 straw	.02⅜	.02½	.02½	.02⅜
38-40 straw	.02⅜	.02½	.02½	.02⅜
38-40 prime white	.02⅜	.02½	.02½	.02¾
PENNSYLVANIA (inland refineries)—				
40-41 prime white	.03½	.04	.03½	.04
NEW YORK (Bayonne, N. J.)—				
32-36	.04		.04	
36-40	.05		.05	
21 (industrial)	.03½		.03½	

Above prices are for distillate oils of zero cold test under 190° F. flash and good odor.

†For Arkansas, Louisiana and Mississippi delivery.

Gas Oil, Diesel Oil and Fuel Oil

Gas oil (G.O.) quoted per gallon basis; Diesel oil and fuel oil per barrel.

	Feb. 21		Feb. 14	
OKLAHOMA (Group 3)—				
32-36 (G.O.) cracking stock	.01¼	.01½	.01⅜	.01⅝
U.G.I. (G.O.)	.01⅝	.01½	.01½	.01⅝
32-36 zero to 15 (G.O.) high flash	.02	.02¼	.02	.02¼
28-30, zero to 10	.85	.95	.85	1.00
26-30, zero to 10	.70	.80	.70	.80
24-26	.45	.55	.50	.60
20-22	.40	.50	.45	.50
Below 16	.35	.40	.35	.40
NORTH TEXAS—				
32-36 (G.O.) industrial	.01¼	.01½	.01¼	.01½
22-26	.40	.50	.40	.50
Below 20	.35	.40	.35	.40
†NORTH LOUISIANA—				
32-36 (G.O.) zero	.02¼		.02½	.02¾
14-16	.35		.35	
†ARKANSAS—				
30-32 (G.O.) zero	.02¾		.02½	.02⅝
14-16	.35		.35	.40
CHICAGO (Based on Oklahoma Group 3)—				
32-36 (G.O.) industrial	.01⅜	.01⅝	.01⅝	.01⅞
28-30 (zero)	.90	.95	.95	1.00
26-28 (zero)	.75	.80	.80	.85
22-26 (zero)	.60	.65	.65	.70
18-22 (zero)	.50	.55	.52½	.57½
Below 18	.45	.50	.45	.50
PENNSYLVANIA (inland refineries)—				
36-40	.03	.03¼	.03	.03¼

Note: Fuel oils of more than 40 cold test generally 5 to 10 cents per barrel less in all areas than shown in above tables.

†For Arkansas, Louisiana and Mississippi delivery.

CALIFORNIA—				
30-34 (G.O.) per bbl.	.90	1.00	.90	1.00
27 plus Diesel	.90	1.00	.90	1.00
15-19 bunker (at tidewater)	.55	.65	.55	.65
15-19 (cargo lots)	.47½	.60	.47½	.60
15-19 (tank cars)	.35	.55	.35	.55
GULF COAST—				
28-30 (G.O.)	.03	.03¼	.03⅛	.03¼
28-30 Diesel	1.50		1.50	
Bunker C (bulk cargoes)	.50		.50	
Bunker C (bunkers)	.60		.60	
NEW YORK (Bayonne, N. J.)—				
28 plus (G.O.)	.03¾	.04	.03¾	.04
*28-30 Diesel	1.65		1.65	
26-30 Diesel (tank cars)	.04		.04	
†Bunker C	.75		.75	

*Lighterage 6½ cents per barrel.

†Lighterage 5 cents per barrel.

Petroleum Coke*

Prices per ton f.o.b. refineries in Chicago area.

Breeze (screenings)	4.50
Still runs	5.50
Lump and egg	6.50

*Refineries will absorb freight to 80 cents a ton.

Neutral Oils

(Viscosity at 100° F. and color)

OKLAHOMA (Group 3)—	Feb. 21		Feb. 14	
Zero to 10 Cold Test:				
150-3	.06¼	.06½	.06¼	.06½
180-3	.07½	.07⅝	.07½	.07⅝
180-4	.07	.07½	.07	.07⅛
200-3	.08	.08¼	.08¼	.08½
200-4	.07⅞	.08	.08	.08¼
240-3	.10	.10¼	.09¾	.10
240-4	.09¾	.10	.09¼	.09½
280-3	.11	.11¼	.11¼	.11½
280-4	.10½	.10¾	.10¼	.10½
300-3½	.11¼	.11½	.11⅝	.12
350-3½	.11¾	.12	.12¼	.12½
400-4	.12¼	.12½	.12¾	.13
500-4½	.13	.13¼	.13·	.13½
100-2 paraffin oil	.04¼	.04½	.04¼	.04½
15-30 Cold Test:				
200-3	.07¼	.07½	.07½	.07¾
200-4	.07	.07¼	.07¼	.07½
240-3	.09¼	.09½	.09¼	.09½
240-4	.09	.09¼	.08¾	.09
280-3	.10¼	.10½	.10¾	.11
280-4	.10	.10¼	.09¾	.10
PENNSYLVANIA—				
150 vis., No. 3, 400-405:				
Zero pour test	.11¼	.11½	.11¼	.12
10 pour test	.10¾	.11	.10¾	.11¼

15 pour test	.09	.09½	.09	.09½
25 pour test	.08	.08¼	.08	.08¼
180 vis., No. 3, 25 pour test	.10¾	.11¼	.10¾	.11¾
200 vis., No. 3:				
Zero pour test	.15¼	.15½	.15½	.16
10 pour test	.14½	.15	.14½	.15
15 pour test	.13	.14	.13	.14
25 pour test	.12½	.13	.12½	.13
GULF COAST—				
Pale Oils:				
100-2-2½	.05¼	.05½	.05¼	.05½
200-3	.06½		.06½	
300-3	.07¼	.07½	.07¼	.07½
500-3½	.09¼	.09½	.09½	.09½
750-3½	.10¼	.10½	.10¼	.10½
1,200-3½	.12½		.12½	
2,000-4	.13½	.14	.13½	.14
Red Oils:				
200-5-6	.05¼	.05½	.05¼	.05½
300-5-6	.06½	.06¾	.06½	.06¾
500-5-6	.07½	.07¾	.07½	.07¾
1,200-5-6	.10½	.11	.10½	.11
2,000-6 plus	.12¼	.12½	.12¼	.12½
CALIFORNIA—				
Pale Oils:				
100-2½-3	.09	.10	.09	.10
200-2½-3	.10	.11	.10	.11
300-3-3½	.11	.11½	.11	.11½
350-3-4	.11½	.11¾	.11½	.11¾
400-3-4	.11¾	.12	.11¾	.12
450-3-4	.12	.12¼	.12	.12¼
550-3-4	.12¼	.12¾	.12¼	.12¾
Red Oils:				
200-4-5	.08¾	.09¾	.08¾	.09¾
300-5-6	.10	.10½	.10	.10½
350-5-6	.10½	.11	.10½	.11
400-5-6	.11	.11½	.11	.11½
450-5-6	.11½	.11¾	.11½	.11¾
500-5-6	.11¾	.12	.11¾	.12
600-5-6½	.12	.12¼	.12	.12¼
700-6½ plus	.12¼	.12½	.12¼	.12½
750-6½ plus	.12½	.12¾	.12½	.12¾
900-6½ plus	.13	.14½	.13	.14½

Bright and Steam Refined Stocks

OKLAHOMA (Group 3)—	Feb. 21		Feb. 14	
630 light green	.07		.07½	.07¾
600 light green S.R.	.04	.05	.04½	.05
600 dark green S.R.	.03	.04	.03½	.04
Bright Stocks:				
190-200 D	.14¼	.15¼	.16	
150-160 D, 0-10	.13½		.14½	
150-160 D, 10-25	.13		.13⅝	
150-160 D, 25-40	.12½		.13⅛	
150-160 E	.12⅝		.13⅛	
PENNSYLVANIA—				
600 S.R.	.08	.08¼	.08	.08¼
650 S.R.	.11	.11½	.11	.11½
600 Pennsylvania flash	.12½	.13	.12½	.13
63) D filtered	.17½	.18	.17½	.18
600 E filtered	.12½	.12¾	.12½	.12¾
Pennsylvania Grade bright stock:				
Bright Stock, No. 8 color, 145-50 vis. 210-540-550 flash:				
10 pour test	.19½	.20½	.20	.21
15 pour test	.17½	.18½	.17½	.18½
25 pour test	.16½	.17	.16½	.17

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—	Feb. 21		Feb. 14	
124-126 white crude scale	.01⅝	.01¾	.01⅝	.01¾
PENNSYLVANIA—				
122-124	.02		.02	
124-126	.02⅛	.02¼	.02⅛	.02¼
NEW YORK (Bayonne, N. J.)—				
120-122	.02⅜		.02½	
125-127	.02¾		.02⅞	
130-132	.03⅛		.03	
133-135	.04		.03⅞	
135-137	.04¼		.04	
Petrolatum in barrels in carload lots:				
Dark green	.01¾		.01¾	
Amber	.02½		.02⅝	
Extra amber	.02½		.02⅞	

Lily white	.05½	.05½
Snow white	.06½	.06½
Cream	.04⅝	.04⅝

Export Prices

GASOLINE

GULF COAST—	Feb. 21		Feb. 14	
U. S. Motor	.03¼		.03½	
60-62 400	.03½	.03⅝	.03⅝	
61-63 390	.03½	.03⅝	.03⅝	
64-66 375	.03¾		.03¾	.03⅞
LOS ANGELES, CALIF.—				
U. S. Motor, 53-55 437 e.p.	.03¾	.04¼	.03¾	.04¼
U. S. Motor, 65 octane num.	.04¾	.05	.04¾	.05
U. S. Motor, 67 octane num.	.05¼		.05¼	
U. S. Motor, 69 octane num.	.05½		.05½	
58-60 400 endpoint gasoline	.04¼	.05	.04¼	.05

KEROSENE

GULF COAST—				
41-43 prime white	.04		.04	.04⅛
41 water white	.04⅛	.04¼	.04¼	.04⅜
LOS ANGELES, CALIF.—				
41-43 water white	.03¾	.04¼	.03¾	.04¼

LUBRICANTS

NEW YORK, (f.a.s. in bbls.)—		
600 filtered	.22	.22
600 Warren E	.18½	.18½
600 S.R. unfiltered	.15	.15
650 S.R. unfiltered	.17	.17
600 flash S.R.	.18½	.18½
630 flash S.R.	.23	.23
Bright stock, No. 8 color	.23½	.23½
Bright stock, No. 6½ color, dil.	.24	.24

NEUTRALS

NEW YORK—Pale Engine Oil, Bulk (vis. at 100)—		
230-3¾	.09¾	.09¾
180-3¼	.09½	.09½
10 -2¼	.05	.05
Red Engine Oil, Bulk (vis. at 100):		
300-6½	.09½	.09½
250-6	.08¾ .09	.08¾ .09
200-6	.08¼	.08¼

Crude Oil Prices

Oklahoma, Kansas, North and East Central Texas

East Texas (see note) ..... $ .50
Corsicana, heavy (Jan. 20, 1933)* ..... .30
Other fields ..... See gravity table

East Texas posted by Tide Water Oil Co., January 18; Sinclair Prairie Oil Marketing Co., January 18; The Texas Company, January 20; Magnolia Petroleum Co., January 20; Shell Petroleum Corp. January 19; Panola Pipe Line Co., January 20; Humble Oil & Refining Co., January 20.
*Magnolia Petroleum Co.

West Texas

Iatan and Westbrook..Same as North Texas
Crane, Upton, Crockett, Howard, Glasscock, Mitchell, Ector, Winkler and Pecos Counties ..... See note below
Lea County, N. Mex. ..... See Rocky Mountain table
Toborg, Pecos County* ..... $ .40

Note—Crane, Upton, etc., effective January 19 by The Texas Company, 30 cents; followed by Humble Oil & Refining Co., Magnolia Petroleum Co., Gulf Pipe Line Co., on January 20, and by other purchasers.
*Shell Petroleum Corp., January 19, 1933.

Texas Panhandle

Gray County, Wheeler County and Carson-Hutchinson Counties....See gravity table

Gulf Coast

Grade A and Grade B specifications discontinued by leading buyers ..... See gravity table
Jennings, La. (Jan. 20, 1933)* ..... $ .35
Cameron Meadows, La. (Jan. 20, 1933)† ..... Below 20 gravity 22 cents, differential 2 cents per degree beginning with 21-21.9 at 26 cents with 40 gravity and over at 52 cents.
Refugio, light ..... See gravity table
Refugio, heavy (Jan. 20, 1933)‡ ..... .45
Markham‖..See Gulf Coast gravity schedule
High Island¶ ..... See Gulf Coast gravity schedule
Conroe ..... See note

*Gulf Refining Co. †Magnolia Petroleum Co. ‡Humble Oil & Refining Co. ‖The Texas Company. ¶Yount Lee Pipe Line Co.
Note—In the Conroe Field, effective January 19, Tide Water Oil Co. posted as follows: 35-35.9 degrees, 59 cents, with 1 cent added for each degree upward to 40 degrees and over, at 64 cents; January 20, Humble Oil & Refining Co. posted 35-35.9 degrees, 54 cents, with 2 cents added for each degree upward to 40 degrees and over at 64 cents.

South Central and Southwest Texas

Darst Creek ..... See note below
Luling (Jan. 20, 1933) ..... $ .30
Mirando (Jan. 20, 1933) ..... .35
Pettus (Jan. 20, 1933) ..... .55
Salt Flat (Jan. 20, 1933) ..... .40
Lytton Springs (Jan. 20, 1933) ..... .45

Note—The Texas Company, January 19, followed by Humble Oil & Refining Co., Magnolia Petroleum Co. and Gulf Pipe Line Co., January 20. Magnolia Petroleum Co. in Luling; Magnolia, Humble and Gulf companies in Refugio crude; Humble and Gulf companies in Pettus; Humble and Gulf companies in Salt Flat; Magnolia Petroleum Co. in Lytton Springs. In Darst Creek, effective January 19, The Texas Company, 35 cents; effective January 20, Magnolia Petroleum Co., 35 cents; Humble Oil & Refining Co., 40 cents; Gulf Pipe Line Co., 40 cents.

North Louisiana and Arkansas

Smackover, Ark. (all grades) ..... See note below
Urania, La. (Jan. 20, 1933) ..... $ .25
East El Dorado, Ark. (Jan. 20, 1933) ..... See note below
Other fields ..... See gravity table

Note—Smackover, all grades, effective January 19 by The Texas Company, 30 cents; January 20, Standard Oil Co. of Louisiana, 20 cents, Magnolia Petroleum Co. 20 cents, Gulf Refining Co. 30 cents. Louisiana Oil Refining Corp. 25 cents. Urania Field posted by Louisiana Oil Refining Co. and H. L. Hunt, Inc., East El Dorado, effective January 20, Magnolia Petroleum Co. 20 cents, Gulf Refining Co. 30 cents.

Rocky Mountain States

OHIO OIL CO.-STANOLIND OIL & GAS CO.
Iles, light (Jan. 18, 1933) ..... $ .40
Iles, heavy (Jan. 18, 1933) ..... .34
Fort Collins, Wellington and Greasewood, Colo., are on contract basis.
Florence (Jan. 18, 1933) ..... .32
Dutton Creek, Wyo. (Jan. 18, 1933) .. .34
Rock Creek, Wyo. (Jan. 24, 1933) ..... .46
Frannie, light (Jan. 18, 1933) ..... .31
Frannie, heavy (Jan. 18, 1933) ..... .20
Salt Creek ..... See Stanolind Mid-Continent price schedule
LaBarge ..... Mid-Continent gravity scale
Big Muddy (Jan. 24, 1933) ..... .50
Grass Creek (Jan. 18, 1933) ..... .62
Grass Creek heavy (Dec. 16, 1932) .. .45
Elk Basin, light (Jan. 18, 1933) ..... .62
Lance Creek (Dec. 16, 1932) ..... .32
Poison Spider (Mar. 5, 1931) ..... .70
Hudson (June 2, 1931) ..... .65
Lander (Mar. 5, 1931) ..... .40
Rex Lake (Feb. 22, 1930) 1.10
Osage (Jan. 18, 1933) ..... .52
Lost Soldier (Apr. 12, 1932) ..... .80
Hamilton Dome (Dec. 16, 1932) ..... .25
Torchlight (Jan. 18, 1933) ..... .62
Greybull (Jan. 18, 1932) ..... .62
Cat Creek (Jan. 18, 1933) ..... .62
Pondera (Nov. 7, 1932) ..... .60
Sunburst, Mont. (Nov. 7, 1932) ..... .75
Hogback, N. Mex. (Jan. 18, 1933) ..... .65
Lea County, N. Mex. (Jan. 20, 1933) .. .30
Maljamar (Jan. 20, 1933) ..... .25
Artesia-Jackson (Jan. 20, 1933) ..... .30

Note—Salt Creek, Cat Creek, Dry Creek, Dallas-Derby, Hudson, Greybull, Hogback, and Iles by Stanolind Oil & Gas Co. and remainder by Ohio Oil Co. Both companies posted Grass Creek light and Elk Basin. Lost Soldier posted by Producers & Refiners Corp. Artesia, Jackson and Maljamar posted by Continental Oil Co. Lea County, effective January 20, posted by Humble Oil & Refining Co. Fort Collins, Wellington, Orchard, Florence, Rattlesnake and Table Mesa by Continental Oil Co. Osage posted by Arro Oil & Refining Co.

Eastern States

JOSEPH SEEP PURCHASING AGENCY
(Effective January 21, 1933)
Pennsylvania Grade Oil in National Transit Lines (Bradford Field) $1.47

(Continued on Page 27)

Crude Oil Gravity Table

Degrees gravity—	Oklahoma, Kansas, North Texas, East Central and Central Texas 1	North Louisiana and Arkansas 2	North Louisiana and Arkansas 3	Gray County, Texas 4	Gray County, Texas 5	Hutchinson, Carson and Moore Counties, Texas 6	Hutchinson, Carson and Moore Counties, Texas 7	Gulf Coast Texas and Louisiana 8	Gulf Coast Texas and Louisiana 9	Salt Creek, Wyoming 10
Below 20	...	...	...	...	...	...	...	.55	.32	...
20-20.9	...	...	...	...	...	...	...	.55	.34	...
21-21.9	...	...	...	...	...	...	...	.55	.36	...
22-22.9	...	...	...	...	...	...	...	.56	.38	...
23-23.9	...	...	...	...	...	...	...	.57	.40	...
24-24.9	...	...	...	...	...	...	...	.58	.42	...
Below 25	...	...	...	...	...	...	...	...	...	...
25-25.9	...	...	...	...	...	...	...	.59	.44	...
26-26.9	...	...	...	...	...	...	...	.60	.46	...
27-27.9	...	...	...	...	...	...	...	.61	.48	...
28-28.9	...	...	...	...	...	...	...	.62	.50	...
Below 29	.28	.28	.20	...	...	...	...	...	...	.28
29-29.9	.30	.30	.22	...	...	...	...	.63	.52	.30
30-30.9	.32	.32	.24	...	...	...	...	.64	.54	.32
31-31.9	.34	.34	.26	...	...	...	...	.65	.56	.34
32-32.9	.36	.36	.28	...	...	...	...	.66	.58	.36
33-33.9	.38	.38	.30	...	...	...	...	.67	.60	.38
34-34.9	.40	.40	.32	.36	.34	.31	.29	.68	.62	.40
35-35.9	.42	.42	.34	.38	.36	.33	.31	.69	.62	.42
36-36.9	.44	.44	.36	.40	.38	.35	.33	.70	.62	.44
37-37.9	.46	.46	.38	.42	.40	.37	.35	.71	.62	.46
38-38.9	.48	.48	.40	.44	.42	.39	.37	.72	.62	.48
39-39.9	.50	.50	.42	.46	.44	.41	.39	.73	.62	.50
40 plus	.52	.52	.44	.48	.46	.43	.41	.74	.62	.52

Note—Effective January 20, the Standard Oil Co. of Louisiana posted the following prices in North Louisiana and Arkansas: Caddo, below 29 gravity, 20 cents; 40 gravity and above, 44 cents. Sabine and De Soto, below 29 gravity, 25 cents; 40 gravity and above, 49 cents. Homer, below 29 gravity, 28 cents; 40 gravity and above, 52 cents. Sarepta and Cartersville, below 29 gravity, 17 cents; 40 gravity and above, 41 cents. El Dorado, below 29 gravity, 25 cents; 40 gravity and above, 49 cents. Haynesville, below 29 gravity, 19 cents; 40 gravity and above, 43 cents. The above all carry 2 cents differential for each degree in gravity. Smackover, all grades, 20 cents.

Column 1—Effective January 18, Stanolind Crude Oil Purchasing Co., Sinclair Prairie Oil Marketing Co.; January 19, The Texas Company; January 20, Magnolia Petroleum Co. (starting at below 25 degrees, 20 cents, with 2 cents added for each degree upward); January 20, Carter Oil Co. in Oklahoma and Kansas and Humble Oil & Refining Co. in North Central and East Central Texas; January 20, Gypsy Oil Co. in Oklahoma and Kansas and Gulf Production Co. in North, Central and East Central Texas; January 18, Globe Oil & Refining Co. and Tide Water Oil Co. in Kansas and Oklahoma; January 19, Empire Pipe Line Co., Shell Petroleum Corp.; January 18, in Oklahoma, Deep Rock Oil & Refining Co., Barnsdall Refineries, Inc., Continental Oil Co., Bell Oil & Gas Co., Tide Water Oil Co., Champlin Refining Co., Anderson-Prichard Corp., Cushing Refining Co., Eason Oil Co., Johnson Oil Refining Co., Mid-Continent Petroleum Corp., Pepper Gasoline Co., Sunray Oil Co., Yale Oil Corp., Twin State Oil Co., Rock Island Refining Co.; January 20, Philtex Oil Co. and Pure Oil Co.; Oklahoma and North Texas, January 18, Continental Oil Co.; Kansas, January 18, Eldorado Refining Co., Vickers Petroleum Co., Skelly Oil Co. (starting below 25 degrees, 20 cents, with 2 cents added for each degree upward); January 19, White Eagle Oil Corp.

Column 2—The Texas Company, January 19; Louisiana Oil Refining Co., January 20; Gulf Refining Co., January 20 (starting at below 25 degrees, 20 cents, with 2 cents added for each degree upward). For Standard Oil Co. of Louisiana schedule see note below price table.

Column 3—Magnolia Petroleum Co., January 20.

Column 4—The Texas Company, January 19.

Column 5—Effective January 20, Humble Oil & Refining Co., Magnolia Petroleum Co., Gulf Pipe Line Co. Effective January 20, Phil Tex Oil Co. posted below 36 degrees, 30 cents, with 2 cents added for each degree up to 40 and above at 40 cents.

Column 6—The Texas Company, January 19.

Column 7—Effective January 20, Humble Oil & Refining Co., Magnolia Petroleum Co., Continental Oil Co. and Gulf Pipe Line Co. Effective January 20, the Phil Tex Oil Co. posted below 36 degrees, 20 cents, with 2 cents added for each degree upward to 40 degrees and above, 30 cents.

Column 8—The Texas Company, January 19.

Column 9—The Humble Oil & Refining Co., Gulf Pipe Line Co., Magnolia Petroleum Co., Sun Oil Co., January 20.

Column 10—Stanolind Oil & Gas Co., January 18.

(California Crude Oil Prices on Page 27)

TANK WAGON MARKETS

Quotations for gasoline and kerosene in United States, as furnished by the larger marketing concerns, include taxes

February 22, 1933

Taxes

The gasoline quotations given in the following tables include the 1-cent Federal tax as well as state, county and city taxes. The gasoline quoted is the regular or standard grade. In most marketing areas a third or competitive grade is generally available at 1.5 or more cents per gallon under the service station price for the regular grade. Ethyl Gasolines are sold 3 cents above the service station price for the regular grade.

Standard Oil Co. (Indiana)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Chicago	14.1	14.1	4.0	10.0
Decatur, Ill.	15.6	15.6	4.0	10.1
E. St. Louis	14.9	13.9	4.0	9.3
Joliet	15.6	14.6	4.0	8.6
Peoria	15.6	15.6	4.0	10.1
Quincy	15.4	15.4	4.0	9.9
Davenport, Ia.	15.7	15.7	4.0	10.4
Des Moines	15.7	15.7	4.0	8.0
Mason City	15.7	15.7	4.0	9.0
Sioux City	15.3	15.3	4.0	10.0
Duluth, Minn.	16.7	16.7	4.0	11.0
Mankato	16.3	16.3	4.0	8.1
Minneapolis	15.4	14.4	4.0	11.0
LaCrosse, Wis.	17.4	17.4	5.0	11.1
Green Bay	16.8	16.8	5.0	10.5
Milwaukee	16.3	16.3	5.0	10.0
Madison	16.5	16.5	5.0	10.2
Detroit, Mich.	16.0	15.0	4.0	8.0
Grand Rapids	15.5	15.5	4.0	8.0
Saginaw	15.8	15.8	4.0	10.8
Evansville, Ind.	16.2	16.2	5.0	†13.9
Indianapolis	16.4	16.4	5.0	†14.1
South Bend	16.7	16.7	5.0	†14.4
Fargo, N. D.	18.1	18.1	4.0	13.0
Huron, S. D.	17.5	17.5	5.0	10.0
Sioux Falls	17.0	17.0	5.0	10.0
K. C., Mo.*	14.1	14.1	4.0	8.7
Springfield*	15.0	15.0	4.0	8.0
St. Louis	12.0	11.5	3.5	9.4
St. Joseph*	13 0	10.9	4.0	7.5
Wichita, Kans.	13.9	13.9	4.0	7.0
Bartlesville, Ok.	13.5	16.0	5.0	8.0

*State tax 3 cents, 1-cent city tax and 1-cent Federal tax.

†Includes 4-cent tax. Buyers of kerosene not used as motor fuel can secure refund of tax.

Effective November 4—New dump discount applicable on all grades of gasoline sold from tank wagon. Any tank wagon customer buying 25 gallons or more at one time will be given 1-cent discount per gallon off tank wagon price at time of delivery. Customers not under contract receive no other discount.

Effective January 1—Discounts on Q.D.A. on 500 gallons or more per month throughout territory; Red Crown Ethyl Gasoline, 3 cents off tank wagon price; Red Crown gasoline, 2½ cents off tank wagon price; Stanolind Blue gasoline, 1 cent off tank wagon price. On deliveries of 75,000 gallons or more each classification allowed 1 cent additional discount.

Discounts on resellers authorized agent's agreement: Same amounts as above except made off service station price instead of tank wagon price.

Stanolind Furnace Oil in Chicago

Effective November 1, 1932, prices f.o.b. Chicago, tank wagon prices: No. 1 (36-40 lt. stw. sere), 100 gallons or more, 7 cents; No. 2 (30-34 stw. sere), 150 gallons or more, 6½ cents; No. 3 (32-36 sere), 400 gallons or more 5.75 cents; No. 4 (32-16 sere), 400 gallons or more, 4.75 cents. Viscosity of No. 4, 80-115 at 100° F.

Fuel Oils

Chicago Oil Heat Institute Prices

Spot market prices on 250 gallons or over deliveries, and top prices on contracts, respectively: 36-40, 7 and 8 cents; 32-36 light, 6¾ and 7¾ cents; 32-36 dark, 6¼ and 7¼ cents; 32-34, 6¼ and 6¾ cents; 34-36, 5 and 6 cents; 18-22, 4¾ and 5¾ cents. On deliveries of less than 250 gallons the spot price is one-half cent higher.

Southwestern District

MAGNOLIA PETROLEUM CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Dallas, Tex.	12.5	15.0	5.0	7.0
Fort Worth	12.5	15.0	5.0	7.0
Houston	12.5	15.0	5.0	8.0
San Antonio	12.5	15.0	5.0	8.0
El Paso	12.5	15.0	5.0	10.0
Texarkana	*15.0	15.0	5.0	†11.0
Muskogee, Okla.	11.5	14.0	5.0	8.0
Okla. City	11.5	14.0	5.0	8.0
Tulsa	12.5	15.0	5.0	8.0
Ft. Smith, Ark.	*13.0	13.0	5.0	†10.0
Little Rock	15.0	15.0	7.0	†10.0

*Less 3½ cents to dealers. †Less 2 cents to dealers.

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Atlanta, Ga.	20.0	20 0	7.0	12.0
Augusta	20.0	20.0	7.0	11.0
Macon	20.0	20.0	7.0	11.0
Savannah	20.0	20 0	7.0	12.5
Birm'ham, Ala.	19.0	19.0	8.0	12.0
Mobile	20.0	20.0	8.0	8 0
Montgomery	21.0	21.0	8.0	14.0
Jackson, Miss.	18.0	18.0	7.0	11.0
Vicksburg	18.0	18 0	7.0	9.0
Jack'ville, Fla.	21.0	21 0	8 0	11 0
Miami	21.0	21 0	8.0	12.5
Pensacola	18.0	18.0	8.0	12.0
Tampa	19 0	19 0	8.0	13 0
Lexington, Ky.	18.5	18.5	6.0	11.5
Covington	17.0	17.0	6.0	11.5
Louisville	18.0	18 0	6.0	10.0
Paducah	19.0	19.0	6.0	9.0

A third grade "Kyso Green" is sold at a price generally 2 cents below the price on the regular grade.

In addition to the state tax of 4 cents on gasoline, Montgomery has city and county tax of 2 cents on gasoline and one-half cent on kerosene. Kerosene prices in Georgia include 1-cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene and one-fortieth cent on gasoline. To Pensacola, Montgomery and Birmingham state taxes add 1-cent tax. To Mobile state tax add 1-cent city tax. Dealers receive discount of 3 cents off tank wagon price throughout territory.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Denver, Colo.	14.0	17.0	5.0	12.5
Pueblo	14.0	17.0	5.0	12.5
Grand Junctn.	18.0	21.0	5.0	14.5
Casper, Wyo.	16.0	19.0	5.0	10.0
Cheyenne	14.0	17.0	5.0	11.5
Butte, Mont.	20.0	23.0	6.0	17.0
Billings	21.0	24.0	6.0	15.5
Great Falls	21.0	24.0	6.0	17.0
Helena	21.0	24.0	6.0	17.0
Salt Lake, Utah	17.0	20.0	5.0	16.0
Albu'que, N. M.	14.0	17.0	*7.0	14.0
Boise, Idaho	20.5	23.5	6.0	15.0
Twin Falls	20.5	23.5	6.0	15.0

*One-cent city tax.

Central South District

STANDARD OIL CO. (LOUISIANA)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
N. Orleans, La.	15.5	15.5	*7.0	†11.0
Baton Rouge	15.0	15.0	6.0	†10.0
Alexandria	13.5	13 5	7.0	†8.5
Lafayette	15.0	15.0	7.0	†10.0
Lake Charles	15.0	15.0	7.0	†10.0
Shreveport	14.0	14.0	6.0	†11.0
Knoxville, Tenn.	19.0	19.0	8.0	13.5
Memphis	16.0	16.0	8.0	10 0
Chattanooga	19.0	19.0	8.0	11.0
Nashville	19.0	19.0	8 0	12.0
Bristol	18.5	18.5	8.0	13.0
Lt. Rock, Ark.	15.5	15.5	8.0	10.0

*Includes city tax of 1 cent. †Louisiana kerosene prices include 1-cent state tax. New Orleans kerosene price also includes 1-cent city tax.

Two-cent discount off kerosene tank wagon price and 2½ cents off gasoline tank wagon price to dealer and commercial accounts.

Ohio

STANDARD OIL CO. (OHIO)*

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Ohio points	13.5	14.0	5.0	*13.0

*Two cents off on gasoline tank wagon to dealers and commercial accounts; 2½ cents off tank wagon on kerosene to dealers.

Nebraska

STANDARD OIL CO. (NEBRASKA)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Omaha	16.2	17.3	5.0	9.0
McCook	17.0	17.0	5.0	11.75
Norfolk	16.5	17.5	5.0	10.75
N. Platte	17.0	17.0	5.0	9.0
Scottsbluff	17.0	17.0	5.0	10.0

Note—Dealers' discount allowed as follows: Red Crown Ethyl, 3 cents off station price; Red Crown, 2½ cents off normal service station price; Nebraska Blue (third grade), 1 cent off normal service station price.

New York and Part of New England District

STANDARD OIL CO. (NEW YORK)*

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Albany, N. Y.	14.0	15.0	4.0	9.0
New York	13.5	13 5	4.0	9.5
Buffalo	12.5	12 5	4.0	9.0
Rochester	14.5	15.5	4.0	9.0
Syracuse	15.0	16.0	4.0	9.5
Boston, Mass.	14.0	14.0	4 0	8.0
Augusta, Me.	17.0	18 0	5.0	9.0
Manch'tr, N. H.	16.5	17.5	5 0	8.0
Burlington, Vt.	17.0	18.0	5.0	8.5

*Discount schedule to commercial accounts are as follows: At service stations, 1 cent per gallon; tank wagon deliveries up to 20,000 gallons monthly, 2 cents per gallon; 20,000 to 100,000 gallons, 2½ cents; 100,000 to 300,000 gallons, 3 cents; 300,000 gallons and up, 3½ cents.

Atlantic Coast District

STANDARD OIL CO. (NEW JERSEY)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Atl'tic City, N.J.	14.0	15.0	4.0	11.2
Newark	13.2	14.3	4.0	8.5
Annapolis, Md.	14.6	15.6	5.0	9.0
Baltimore	14.0	15.0	5.0	8.0
Cumberland	15.5	16.5	5.0	11.7
Wash'g'n, D. C.	13.2	13.2	3.0	10.0
Danville, Va.	16.7	17.7	6.0	11.0
Norfolk	15.1	16.1	6.0	10.2
Petersburg	16.2	17.2	6.0	11.4
Richmond	15.5	16.5	6.0	10.7
Roanoke	16.7	17.7	6.0	11.9
Charle'n, W. Va.	15.4	16.4	5.0	11.6
Parkersburg	14.0	15.0	5.0	10.2
Wheeling	15.0	16.0	5.0	11.2
Charlotte, N. C.	17.2	17.2	7.0	12.5
Hickory	18.5	18.5	7.0	13.7
Mt. Airy	18.6	18.6	7.0	13.8
Raleigh	17.1	18.1	7.0	12.3
Salisbury	18.4	19.4	7.0	13.6
Charleston, S.C.	16.1	17.1	7.0	10.3
Columbia	18.0	19.0	7.0	12.2
Spartanburg	15.5	16.5	7.0	13.5

Two cents per gallon discount off tank wagon price of gasoline to dealers except Washington, D. C., and Baltimore, Md., where discount is 3 cents. Kerosene 1 cent off tank wagon for 25 gallons or more under contract except New Jersey.

Naphtha

	Tank: Wagon	Tank: Car
Oleum spirits	10.7	6.32
V.M.&P. naphtha	12.7	7.32
Cleaners' naphtha	15.3	9.32
Stanisol	15.3	9.32

Tank wagon prices f.o.b. Chicago January 4, 1932. Each of above prices subject to discount of 1 cent per gallon for 150-gallon lots if covered by contracts.

Canada

IMPERIAL OIL, LTD.
Imperial 5-Star Gasoline

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Hamilton, Ont.	22.5	25.5	6.0	15.5
Toronto, Ont.	22.5	25.5	6.0	15.5
Brandon, Man.	29.0	32.5	7.0	17.5
Winnipeg, Man.	26.0	29.5	7.0	17.5
Regina, Sask.	29.0	33.0	6.0	21.5
Saskatoon, Sask.	31.0	35.0	6.0	23.5
Edmonton, Alta.	29.0	32.5	5.0	23.5
Calgary, Alta.	25.5	29.0	5.0	19.5
Vancouver, B.C.	26.5	29.5	7.0	15.5
Montreal, Que.	22.0	25.0	6.0	15.0
St. Johns, N.B.	24.5	28.5	7.0	20.5
Halifax, N.S.	23.5	27.5	6.0	20.5

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA*

	Gasoline: Tank truck†	Gasoline: Posted retail	Gasoline: Inc'ls tax of	Kero. tank wagon
Fresno	19.0	18.0	4.0	14.0
San Francisco	19.0	18.0	4.0	12.5
Los Angeles	16.5	15.5	4.0	13.5
Reno, Nev.	23.0	22.0	5.0	15.5
Portland, Ore.	16.4	15.4	5.0	13.5
Seattle, Wash.	17.4	16.4	6.0	13.5
Tacoma	17.4	16.4	6.0	13.5
Spokane	20.9	19.9	6.0	18.0
Phoenix, Ariz.	18.0	20.0	6.0	†16.0

*Retail prices posted by Standard Stations, Inc., a subsidiary.

†Above prices are at company's plant or depots as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where the discount is 1 cent. ‡Includes 5-cent state tax.

Pennsylvania-Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'ls tax of	Kero. tank wagon
Pittsburgh, Pa.	13.0	14.0	4.0	9.0
Philadelphia	13.0	13.0	4.0	9.0
Scranton	13.5	14.5	4.0	9.0
Allentown	13.5	14.5	4.0	9.0
Altoona	13.5	14.5	4.0	9.0
Erie	13.0	14.0	4.0	9.0
Dover, Del.	13.5	14.5	4.0	9.0
Wilmington	13.0	14.0	4.0	9.0
Springf'd, Mass.	14.5	14.5	4.0	8.0
Worcester	14 5	15.5	4.0	8.0
Boston	14.5	15.5	4.0	8.0
Providence, R.I.	12.5	13.5	3.0	8.0
Hartford, Conn.	12 5	12.5	3.0	8.0
New Haven	12.5	12.5	3.0	8.0

Discount schedule effective November 1 1932. In Delaware and Pennsylvania, 2 cents off station price on purchases of 2,000 gallons or more per month, in remainder of territory 1 cent. Wholesale discount 2½ cents per gallon on monthly deliveries of 20,000 to 100,000 gallons, 3 cents on 100,000 to 300,000 and 3½ cents on more than 300,000 gallons.

TANK WAGON CHANGES

(Regular Grade Gasoline and Kerosene)

Standard Oil Co. (Indiana), effective February 8, reduced kerosene tank wagon price 1 cent at Detroit; effective February 10, reduced kerosene tank wagon price 2.3 cents at Grand Rapids, Mich.

Standard Oil Co. of New Jersey, effective February 7, reduced gasoline tank wagon price 1 cent and service station 2 cents at Raleigh, N. C.

Standard Oil Co. of Louisiana, effective February 14, advanced gasoline tank wagon and service station prices 1 cent at Nashville, Tenn., and 2 cents per gallon at Chattanooga and Knoxville, Tenn.; effective February 16, reduced gasoline tank wagon and service station 1 cent at Memphis, Tenn.; effective February 17, advanced gasoline tank wagon and service station prices one-half cent in entire territory.

Standard Oil Co. (Kentucky), effective January 14, advanced gasoline tank wagon and service station prices 1 cent at Louisville, Ky.; effective February 1, reduced kerosene tank wagon price 1 cent at Paducah, Ky.; effective February 7, reduced kerosene tank wagon price 3 cents at Vicksburg, Miss.; effective February 9, reduced gasoline tank wagon price 1 cent at Vicksburg, Miss.; effective February 14 reduced kerosene tank wagon price 2 cents at Mobile, Ala.; effective February 6 reduced kerosene tank wagon price 2 cents at Montgomery, Ala.; effective February 13 advanced gasoline tank wagon and service station prices 2 cents at Atlanta, Ga.; effective February 13, advanced gasoline tank wagon and service station prices 1 cent at Augusta, Ga.; effective February 13, advanced gasoline tank wagon and service station prices 1 cent at Macon, Ga., and Savannah, Ga.

Standard Oil Co. (Nebraska), effective January 28, reduced gasoline tank wagon and service station prices to 17 cents, including tax.

EXPANDING MARKET FOR COKE

NEW YORK, Feb. 20.—Continued expansion in demand for petroleum coke, both in domestic and export markets, is reported in local trade circles. Eastern coal handlers are marketing larger quantities of petroleum coke than ever before, and export sales are steadily gaining.

Reports from the Gulf area state that shipments of petroleum coke from Houston, Tex., both to the Atlantic Seaboard and in the export trade, continue to show no signs of abatement and with the recent loading of several full cargoes for Cuban ports, and the booking of additional cargoes, indications are that the movement this year will be the largest in the history of the port.

PETROLEUM ACCOUNTANTS

The regular monthly meeting of the Petroleum Accountants Society of Oklahoma will be held Friday, February 24, at 6:15 p.m. at the Mayo Hotel. The program committee has arranged to present a program on the Oklahoma state income tax law and the Oklahoma franchise tax law.

NEWS FOR SALES DEPARTMENTS

Uphold Rights of Refiner in Using Colors at Station

The right of a manufacturer of petroleum products to establish and protect a distinctive combination of colors as its trade identification has been upheld in Federal Court in Florida as a result of a suit brought by the Shell Petroleum Corp. against J. A. Plummer, owner of a roadside service station between Jacksonville and Marietta, Fla. The court's action gives Shell the exclusive right to use red and yellow to distinguish service stations handling its products.

After Mr. Plummer, handling the products of an independent Jacksonville jobber, had painted his station, pumps and other equipment red and yellow, he was asked by a Shell representative to change the color scheme. He refused. The injunction suit followed and Judge Louis Strumm, sitting in U. S. District Court for the Eastern District of Florida, granted first a temporary and then a permanent injunction restraining Mr. Plummer from using the red and yellow color scheme in selling gasolines and oils that are not Shell products.

At the hearing, the Shell Petroleum Corp. brought out the fact that it has used red and yellow some 15 years to identify all stations handling its products. It contended that large sums have been spent in advertising and that much of this advertising was identified by the colors in question. Hence, it alleged, there has been established in the mind of the public buying petroleum products a distinct connection between red and yellow and Shell. This, it was maintained, constituted a valuable property right, full benefit of which Shell was not receiving as long as another was permitted to use Shell colors in connection with the sale of petroleum products.

Practically the only defense offered by the defendant was that Shell had no right to establish in itself the exclusive right to any color combination, and that Shell colors were not red and yellow, but rather red, yellow, gray and possibly green. On cross-examination, however, he admitted he had seen only a few Shell stations which had used gray and green and that where gray was used it served merely as a background and the customary red and yellow were prominently displayed. He said the reason he believed Shell colors had been changed was because an unidentified salesman had told him that Shell was now using gray and green.

The court held such statements were not binding on Shell and that the red and yellow constituted a valuable property right, to which Shell should be exclusively entitled. Hence a permanent injunction was issued restraining Mr. Plummer from use of these colors. The ruling is expected to serve as a precedent for any similar future litigation.

MOORE HEADS ASSOCIATION

Floyd Moore, of the Seneca Petroleum Co., has been elected president of the Chicago Burning Oil Distributors Association which in the future will have charge of activities for oil burner distributors in that city following the suspension of activities by the Chicago Burning Oil Institute. The association is planning to expand its activities with trade relations work in charge of Aaron Sapiro.

C. R. Jonswald has been elected vice president of the association. All directors were re-elected with the exception of C. R. Rosenthal, who was succeeded by O. L. Peterson of the George C. Peterson Co.

High Taxes Play a Part in Unsatisfactory Market Conditions Throughout Ohio

COLUMBUS, Ohio, Feb. 17.—All branches of the oil business must unite immediately to fight against the spread in taxes on petroleum products both direct and indirect, according to several speakers who appeared on the program of the tenth annual convention of the Ohio Petroleum Marketers Association, which closed here today after a three-day session. The meetings were largely attended by refining and jobbing interests in Ohio.

It was apparent that taxes are the problem of greatest concern to the oil interests of the State. Speakers were opposed to the plan now being considered by the Ohio Legislature to divert part of the gasoline tax receipts from the highways to relief funds. It was also pointed out that the higher taxes constantly encourage bootlegging, which is in part responsible for the present unsatisfactory gasoline tank wagon and retail prices in the State, and is also tending to reduce consumption of motor fuels.

In addition to the direct taxes, T. R. Dahl, vice president of the White Motor Co. of Cleveland, Ohio, told the oil marketers that the oil industry is directly concerned in the national and state legislation which aims to restrict the use of trucks and other heavy motor vehicles.

Referring to the complaints of railroads that trucks are not bearing their share of road maintenance and that the rails have suffered through the highway competition, Mr. Dahl said the railroads had experienced a considerable loss of business, but pointed out that practically all lines of business have suffered similar declines.

"In 1929, a peak rail traffic year," he declared, "2¼ per cent of the tonnage on all railroads was in L.C.L. freight (less than carload lots), and it took 26.2 per cent of the freight cars to carry this L.C.L. freight. The problem is that of the truck competition for that 2½ per cent.

"In 1929 trucks carried 3½ per cent of the total freight, while the Great Lakes carried 600 per cent more than the trucks."

Referring to taxation, Mr. Dahl said that in 1930 trucks paid $293,000,000 in special taxes, while the railroads paid $300,000,000, exclusive of their income taxes, and that in Ohio approximately $20,000,000 were paid by the railroads, $49,700,000 were paid by motor vehicles, of which $21,000,000 was paid by trucks.

He asserted that the Interstate Commerce Commission's attitude in dealing with the bus and truck highway use was from the viewpoint of the public interest, and that since complaints against the truck competition have come from the railroads and not the public, there was no necessity for the commission to act.

"The entire matter settles itself into a matter of economics. We are not going to get anywhere by fighting. If trucking interests can move freight cheaper, then the general public is benefited through lower prices for the articles so transported," he concluded.

Markham Speaks

Taking as his subject "The Petroleum Marketer and His Taxes," Baird H. Markham, director of the American Petroleum Industries, explained the effect of excessive taxation of petroleum products, particularly gasoline, upon the industry generally and especially upon the marketer. He urged the marketers to regard the current tax situation, with government imposing more taxes upon motor vehicles and upon gasoline, as a crisis demanding action on the part of every oil man, not only from the standpoint of selfpreservation, but in the public interest.

"It seems to me," he said, "that in seeking gasoline tax reduction, the prevention of tax evasion, the elimination of tax diversion, and the defeat of restrictive regulation, we are working in the public interest."

ARMY AWARDS CONTRACTS

NEW YORK, Feb. 20.—Standard Oil Co. of Louisiana has been awarded an order for 50,000 gallons of gasoline for delivery to the U. S. Engineer at New Orleans at 7 cents per gallon, 2 per cent. Standard of Louisiana also received an order for 5,000 gallons of fuel oil at 4½ cents per gallon, same delivery as above. Home Oil Co. of Vicksburg has received from the U. S. Engineer at Vicksburg an order for 15,000 bbls. of fuel oil at $5,625.

NEW OUTLET FOR GASOLINE

A high-speed, light-weight, self-propelled railway passenger car for which an operating cost of 10½ cents a mile is claimed is now being demonstrated for railroad officials on Michigan Central tracks near Battle Creek, Mich.

The 40-passenger car, called an "autotram," is built of aluminum, streamlined, with low gravity center which permits a safe cruising speed of 70 miles an hour. It is powered by a 16-cylinder automobile-type engine. It is 60 feet long and 9 feet wide, with front resembling a huge automobile hood. The rear tapers to a point. The weight is 26,000 pounds, about one-fourth of the ordinary railroad coach.

The walls are insulated and the windows of double glass are immovable. Air is changed every 20 minutes.

TRANSFER TURLEY TO VICTORIA

CHATHAM, Ontario, Feb. 18.—Frank Turley, for more than 14 years manager of the northern Alberta division of Imperial Oil, Ltd., with headquarters at Edmonton, has been appointed manager of the Pacific Coast division with headquarters at Victoria, British Columbia. The transfer becomes effective toward the end of February. Under his management the division grew from 60 to 242 substations, and in volume of business, among the six divisions in the West, advanced from sixth to second place.

HEADS OIL TRADES ASSOCIATION

NEW YORK, Feb. 20.—Clarence D. Jones, of C. D. Jones & Co., has been elected president of the Philadelphia Oil Trades Association for 1933. Stanley W. Rusk of the Rusk Oil Co. was elected vice president.

Other officers elected were as follows: Howard M. Rogers, the C. K. Smith Co., secretary; J. H. Stevenson, Stevenson Brothers & Co., treasurer; and the following directors: Joseph M. Patterson, of J. M. Patterson & Co.; A. H. Ireland, Crew-Levick Co.; Harry J. Walter, Pure Oil Co.; L. Beebe, Troco Lubricants Co.; C. A. Borda, James B. Berry Sons & Co.; O. A. C. Hagen, Otto A. C. Hagen Co.; and W. F. Fancourt, Jr., W. F. Fancourt & Co., Inc.

Government Bureau Reports on Value of Gasoline Dopes

WASHINGTON, D. C., Feb. 18.—Various dopes for gasoline have been tested by the Bureau of Standards. In reply to an inquiry by the National Petroleum Association as to the efficiency of such dopes, including lubricated gasoline, the bureau states:

"The Bureau of Standards has had occasion to make engine tests of various dopes including lubricants alleged to improve automobile engine performance, remove or prevent the formation of carbon deposits, lubricate the upper combustion chamber and reduce wear and/or friction of valves. In no case has the treatment of gasoline with 1 per cent or less of such dope been found to have any significant effect, beneficial or otherwise, unless the dope affected the tendency of the fuel to knock or detonate. Antiknock dopes have not been found to affect wear, friction or carbon.

"The rate at which carbon deposits accumulate in the engine cylinder depends on many operating factors and so extended tests under carefully controlled conditions are required to detect differences in this rate. Such tests usually have indicated that adding small amounts of lubricating oil to the fuel tends to increase the rate of carbon formation. Most of the products added to make 'lubricated gasoline' appear to be mainly mineral oil but some contain a small percentage of animal or vegetable oil or a small percentage of colloidal graphite.

"Once an automobile engine has been run in, adequate lubrication of the cylinder wall should be accomplished from the crankcase without necessity for adding a lubricant to the fuel. It is the function of piston and ring design to get the necessary lubricant where it is needed without admitting much oil to the combustion chamber. Conditions of inadequate cylinder wall lubrication may arise where some benefit would result from the use of lubricated gasoline."

INDIANA GALLONAGE CHANGES

There was considerable change in the gasoline gallonage of the major companies in Indiana during 1932 compared to 1931, according to gasoline tax collection data which have just been made available. The changes varied from 34.2 per cent loss in the case of The Texas Company to a gain of 287.3 per cent in the case of the Phillips Petroleum Co., the latter being a newcomer among the major distributors in Indiana.

The following report gives the gallonage of the 12 leading companies:

	1932	1931	% Loss
Stand. (Ind.)	111,992,461	134,256,158	16.5
Shell	38,264,980	48,179,620	20.5
Indian	30,017,967	30,686,488	2.0
Sinclair	24,365,347	25,776,439	5.5
Lincoln	22,902,312	24,607,446	6.9
Gulf	14,389,918	8,074,420	*78.2
Mid-Cont. Pet.	10,190,160	11,047,351	7.7
Phillips	9,768,390	2,521,801	*287.3
Cities Serv.	8,359,160	8,691,286	3.8
Pure	8,006,649	8,632,642	7.2
National	6,453,171	5,630,209	*14.6
Texas	6,432,568	9,777,353	34.2
Miscellaneous	147,443,907	162,589,269	10.0
Total	428,630,990	481,470,482	3.8

*Increase.

BUILDING TERMINAL FACILITIES

The American Oil Co., affiliated with the Pan American Petroleum Transport & Export Co., is adding to its distributing facilities at Philadelphia, Pa., by the erection of a water terminal on Schuylkill. The terminal will have facilities for unloading barges.

NEWS FOR PETROLEUM REFINERS

Gulf Company Plans to Build New Plant at Saint John, N. B.

Negotiations for the establishment of a large new refinery at St. John, New Brunswick, Canada, are now being carried on between the Civic Industrial Committee of that city and officials of the Gulf Refining Co., Pittsburgh, Pa. The project is said to be sponsored by Putnam Brothers, Ltd., of Houlton, Me., who market Gulf products in New Brunswick as well as in their home state and elsewhere.

The initial cost of the new plant would be in the neighborhood of $750,000, and provision would be made for expansion. The plant at the start would produce about 2,000 bbls. daily of oil of the type used by oil-burning vessels. The plant would also produce gasoline and other refined products. A suitable site for the plant has been made available at East St. John, through the St. John Harbor Commission, it is stated.

The officials with whom the Civic Industrial Committee have already conferred are Charles C. McCullough, of New York, engineer of the Gulf Refining Co.; A. O. Putnam, treasurer of Putnam Brothers; and W. B. Redding, also representing the same company, both of Houlton, Me. The Gulf company has several refineries in the United States and other countries. The company plans to expand its refining facilities in Canada.

Three California Refiners Obtain Fuel Oil Contracts

LOS ANGELES, Calif., Feb. 18.—Three southern California refiners were awarded large fuel oil contracts by the Navy Department this week. The contracts totaled 1,500,000 bbls. with a total price of $770,400. Delivery will start March 15 and be completed at the end of the fiscal year, June 30.

The Texas Company will supply 600,000 bbls., 300,000 bbls. at 52.9 cents a barrel, and 300,000 bbls. at 53.9 cents.

Hancock Oil Co. will furnish 500,000 bbls., 300,000 bbls. at 46.4 cents, and 200,000 bbls. at 51.4 cents.

Sunset Pacific Oil Co. will supply 400,000 bbls., 300,000 bbls. at 51.5 cents and 100,000 bbls. at 53.5 cents.

The award was a deficiency item to supply fuel for the Navy, a contract for which will be completed, March 15, with the Union Oil Co.

TO USE PILOT BUTTE CRUDE

The Big Four Oil Co., which has several shallow producers on the Enos tract in the Pilot Butte Field, Wyoming, has made arrangements for shipping crude to Casper where it will be refined in the refinery recently completed at Mills, near Casper, by Wyoming Oils, Inc. The crude will be trucked from the field to Riverton. At Riverton it will be shipped out in tank cars. It is planned to make three shipments of two cars each per week. The new refinery, built by Jarvis and others, has a charging capacity of 200 bbls. per day.

BELL IMPROVEMENTS START

GRANDFIELD, Okla., Feb. 18.—The Bell Oil & Gas Co. of this city put over 100 men to work this week in an improvement program at its local refinery. The plant is also increasing its daily capacity and is now preparing to replace its 3-inch pipe line from the Red River bed to the plant here with a 6-inch pipe.

Conroe Assures Refiners Large Supply of Desirable High Gravity Crude Oil

The Conroe Field of Texas Gulf Coast, often referred to as the most important new oil field discovered in 1932, is now certain to be an increasingly important factor in refinery crude oil supplies throughout 1933. The crude oil at present is being moved south to Gulf Coast points, where it is being made available to Gulf Coast and Atlantic Coast refineries.

The crude oil belongs to the high gravity grade with large yields of gasoline and kerosene obtainable by straight distillation. The octane rating of the straightrun gasoline cut is better than average, although the gravity is low. The sulphur content is low, so that no special treating problems have developed in refining the straightrun and cracked gasolines. The following report gives complete data based on various laboratory tests of the crude oil:

Conroe Crude

Gravity, ° A.P.I.	38.2
Sulphur, %	.04
Color	Dark green

DATA ON PRODUCTS

(a) Naphtha

	Spec. 400 E.P. naphtha
Per cent	39.8
Octane No.	60.8
Sulphur (untreated), %	.03
% at 212° F.	15.5
% at 284° F.	54.0
Final boiling point, ° F.	400
Gravity, ° A.P.I.	50.8

(b) Kerosene

	Kerosene after 400 E.P. naphtha
Per cent	20.4
Gravity, ° A.P.I.	35.9
R. O. viscosity	475
Sulphur, %	.04
Final boiling point, ° F.	512

(c) Other Products

	Gas oil past the normal 475 ref. oil	Cracking stock past the gas oil	Bottoms
Range of cut, %	60.2-80.0	80.0-95.0	95.6-100
Per cent	19.8	15.0	4.4
Gravity, ° A.P.I.	32.5	28.2	17.2
Flash, ° F.	235	...	535
Vis. at 210° F.	...	...	378
Pour test, ° F.	30	...	...
Sulphur, %	.13	.27	.42
Aniline point, ° F.	162	...	...
Final boiling point, ° F.	638	...	...

DISTILLATION OF CRUDE CONTROLLED REFLUX STILL

Tests on Crude

Gravity, ° A.P.I.	38.2
Vis. at 100 ° F.	32
Flash, ° F.	R. T.
B.s. and w., %	.3
Sulphur, %	.04
Color	Dark green

Distillation of Crude

Charged 16,000 cc. over at 250° F.
Steam in at 450° F.

Cut No.	Range of cut %	Temp. ° F.	Gravity ° A.P.I.
1	0.0-10.0	375	65.2
2	10.0-12.5	395	51.1
3	12.5-15.0	405	50.5
4	15.0-17.5	410	50.1
5	17.5-20.0	420	47.2
6	20.0-22.5	430	45.6
7	22.5-25.0	440	45.2
8	25.0-27.5	450	45.0
9	27.5-30.0	460	44.5
10	30.0-32.5	470	44.2
11	32.5-35.0	475	43.7
12	35.0-37.5	485	42.7
13	37.5-40.0	490	41.3
14	40.0-42.5	495	40.4
15	42.5-45.0	500	38.7
16	45.0-47.5	510	37.2
17	47.5-50.0	520	35.9
18	50.0-52.5	530	35.2
19	52.5-55.0	535	34.3
20	55.0-57.5	545	33.5
21	57.5-60.0	555	32.9
22	60.0-62.5	560	32.6
23	62.5-65.0	570	32.4
24	65.0-67.5	575	32.2
25	67.5-70.0	585	32.0
26	70.0-72.5	595	31.9
27	72.5-75.0	610	31.8
28	75.0-77.5	620	31.7
29	77.5-80.0	630	31.6

Gas loss, 6% (converted to cc. chg.).

DRY ENGLER DISTILLATIONS ON LIGHT FRACTIONS

	Light crude	Specification naphthas 375 E.P.	400 E.P.
Per cent	17.9	33.0	39.8
Gravity, ° A.P.I.	57.6	55.4	50.8
I.B.P., ° F.	125	127	132
% at 212° F.	58.0	36.0	15.5
% at 284° F.	96.5	94.5	54.0
F.B.P., ° F.	310	335	400
Octane No.	72.0	71.0	60.8

	Ref. oil (spread)
Range of cut, %	30.0-73.6
Gravity, ° A.P.I.	36.4
Flash, Abel, ° F.	132
R. O. viscosity	460
Sulphur, %	.04
Ring No.	—1
F.B.P., ° F.	560

	Cracking stock (past ref. oil spread)
Range of cut, %	73.6-95.0
Gravity, ° A.P.I.	29.7
Sulphur, %	.10
Aniline point, ° F.	185

	Cracking stock (past 400 ref. oil)
Range of cut, %	60.2-95.0
Gravity, ° A.P.I.	31.1
Sulphur, %	.12
Aniline point, ° F.	175

DISTILLATION ON VACUUM STILL CUTS

	1	2	3
Range of cut, %	80-85	85-90	90-95
Temp. liquid, ° F.	450	470	540
Abs. pressure	.10	.10	.10
Gravity, ° A.P.I.	29.9	28.7	26.8
Flash, ° F.	345	410	420
Fire, ° F.	395	450	470
Visc. at 210° F.	35	39	44
Visc. at 100° F.	67	99	Wax
Pour test, ° F.	70	90	100

TO INCREASE SHAMROCK RUNS

AMARILLO, Tex., Feb. 18.—The Shamrock Oil & Gas Co. won when it asked the railroad commission at a hearing held here today to divorce the Moore County Field from the Panhandle Field proper for proration purposes. It withdrew the part of its petition asking for the area to be set out as a separate field.

There is only one market or outlet for the oil produced in the Moore County area. The Apache Refining Co., that has a small plant at Sunray a few miles north of the field, processes the oil produced in the area. Requirements of this plant are 1,500 bbls. per day while the area has been prorated to 672 bbls. per day, not a sufficient amount to allow operation of the refinery. Capacity of the plant is 2,800 bbls.

The Shamrock Oil & Gas Co., producer in the area, has a gathering system and is operating the refinery, and agreed to take all oil produced on an equitable basis from all wells in the pool.

ORGANIZE TYLER COMPANY

The Tyler Refining Co. has been organized under the laws of Texas for the purpose of building a refinery in East Texas. The plant probably will be located near Arp.

J. E. McKee, of the T. & P. Drilling Co., is president of the new refining company. Incorporators named in the charter are A. F. Knappenberger, R. S. Harper and E. C. Holt.

Letter Ballot of A.S.T.M. Favors C.F.R. Motor Test

The results of a letter ballot of the D-2 Committee of the A.S.T.M. affirms the action taken by representatives of that committee a month ago in which the adoption of the C.F.R. Motor method for determining the octane value of motor fuels was recommended. The results of the letter ballot show 33 members favorable to adoption and 12 members against it. The vote is considered decisive enough to enable its formal adoption before April 1 as a tentative standard.

Considerable opposition developed between the time the representatives of the committee recommended the change and the time the letter ballots were distributed. The opposition claimed that the change from the C.F.R. research method to the motor method penalized cracked gasoline too greatly and also that if it was the aim of the A.S.T.M. to adopt a test method that would duplicate road test results, a revision would have to be made almost yearly or, whenever there was an important change in the design of automobile motors.

Atlantic Files Protest to Shipping Board Decisions

NEW YORK, Feb. 20.—Violation of the Constitution by laying an undue burden, "amounting to an embargo," on the shipment of refined petroleum products from the port of Philadelphia to South African ports, is charged in a brief filed with the Shipping Board by George W. Edmonds, manager of the Port of Philadelphia Ocean Traffic Bureau, asking for a reopening of the Atlantic Refining Co.'s ocean freight rate discrimination case.

The action, which was recently dismissed by the Shipping Board on the ground that no violation as alleged had been shown, was brought against virtually all the steamship lines trading between Philadelphia and New York and South and East African ports. The steamship lines have been charging Atlantic Refining Co. approximately 6 cents per case more on shipments from Philadelphia than for similar shipments made from New York to the same destinations. The board refused to reopen the case, and the current petition is in protest against this refusal.

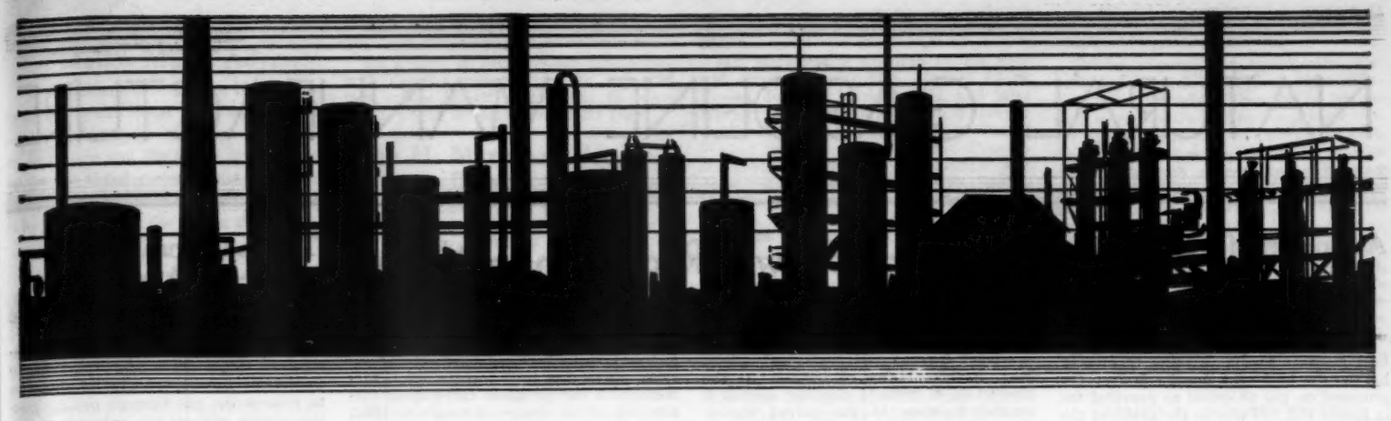
The current brief points out that the board's refusal of a rehearing as provided under Section 23 of the Shipping Act of 1916 constituted a violation of the Fifth Amendment to the Constitution, which guarantees a full hearing and due process of the law.

PROCEEDINGS OF A.S.T.M.

Reviews of the 1932 proceedings of the American Society for Testing Methods, Engineers Club Building, 1315 Spruce Street, Philadelphia, Pa., are now available at the society's headquarters. As customary the reviews are issued in two parts; Part 1 includes the annual reports of the many committees, and Part 2, the technical papers. Together they comprise 1,895 pages.

Each part of the proceedings is available at the following prices: Paper binding, $2.50; cloth, $6; half leather, $7.

An Index to A.S.T.M. Standards and Tentative Standards as of October, 1932, is now available from the society without charge.



Refinery Tubes for Refinery Men Who Are Quality Conscious

The world's largest manufacturer of alloy steel tubing now offers the refining industry a complete line of quality tubes—any analysis and any size.

Behind every Timken tube are sixteen years of tube-making experience... two of the country's newest tube mills... two smaller auxiliary tube mills for specialties... complete bar and billet mills... electric and open hearth furnaces with a capacity of 30,000 tons a month... a manufacturing and metallurgical staff known for its progressiveness in the technique of tube making... and complete control of the raw material, for *Timken tubes are made of Timken Steel.* The Timken Steel and Tube Company, Canton, Ohio.

TIMKEN STEEL TUBES

NATURAL GASOLINE MANUFACTURE

Adoption of Tax May Cause Some Plants to Close

The operation of many Oklahoma natural gasoline plants is being threatened by the one-half cent per 1,000 feet tax proposed on gas produced as provided for in House Bill 248 now in the hands of the state oil and gas committee. The tax will be paid by the producer, but the proposed levy is in excess of what he receives for his gas and, since there is no market for the existing supply, there is little chance of passing on the added weight. If the bill is passed in its present form it will work serious hardships on the natural gasoline industry even though that industry is not concerned with the payment of the tax and some of the inequalities in the bill from the standpoint of the plant operator will prove this point.

It will be remembered that the bill provides for a tax of one-half cent per 1,000 feet of gas produced regardless of how the gas is utilized. Justification for the tax apparently lies in the fact the gas may be processed to recover marketable products. However, the bill fails to recognize the fact that the quality of gas varies greatly.

An example of the actual application of the tax will serve to show the inequalities in the proposal. At present approximately 75 per cent of the marketable casinghead gas in Oklahoma is sold on contract and only 25 per cent is processed in the producers' own plants. The average royalty payment made by the plant to the producer is from 10 to 15 per cent of the value of the natural gasoline extracted. This arrangement is provided for through a standard form of contract that is in general use. The average gasoline content of such gas in Oklahoma is 1.4 gallons per 1,000 feet and the present spot price is 2 cents per gallon. On this basis, the producer now receives 10 per cent of 2.8 cents, or .28 cent, as his pay for the gas, and if the bill is passed he will be obligated to the State to pay .5 cent, or nearly twice as much as he receives.

In those field such as that at Oklahoma City, where the gas contains but one-half gallon per thousand, the amount received by the producer on contract is only 5 per cent of the value of the products, except where well pressure is sufficiently high to permit processing without boosting. In the latter case the buyer receives an additional 5 per cent. However, where the producer does not receive this added amount he will receive 5 per cent of 1 cent, or .05 cent, and he will be paying a tax of 10 times this amount.

All Fields Show a Reduction in Natural Gasoline Yield Except Oklahoma City

Except for the Oklahoma City Field, every important area contributing to the production of natural gasoline showed a marked decrease in the output during 1932 compared to that of 1931. The decline for the country approximated 329,500,000 gallons. The output during the past year was only 82 per cent of that for 1931. Production was decreased to the point where stocks also were materially reduced, the stocks on the first of January of last year approximating 27,100,000 gallons while stocks on the first of this year were 18,800,000 gallons, according to the Bureau of Mines.

These facts permit a rather optimistic view to be taken regarding 1933. The industry is in a favorable statistical position at present, has shown its ability to adjust its operations to changing market demands, is not threatened with known, uncontrolled, flush fields which yield a large volume of wet gas and conditions have so shaped themselves outside the industry as to indicate natural gasoline will assume a more important role as a constituent of motor fuel over the immediate future.

The only area which may prove a disturbing source of natural gasoline for 1933 are those fields along the Gulf Coast which have been proved to the extent of one or two wells but whose real potential production of both crude oil and wet gas remains uncertain. The area which will command immediate attention in this respect is Conroe. A 10-inch gas line is now under construction which will reach from the field to Houston and although the oil production will no doubt be held back by proration, there promises to be room for gasoline plants having a total capacity of 100,000,000 feet within the very near future. The gas will make about 1 gallon of natural gasoline per thousand feet and has no unusual characteristics that would limit its usefulness.

In California there are several fields which could materially increase their output of natural gasoline at any time proration is moderated, but each of these, with the exception of the Kettleman Hills Field has shown definite signs of natural decline.

The only important field in the Mid-Continent area which apparently will continue to produce a large quantity of natural gasoline throughout the coming year is the Oklahoma City Field. Here proration has decreased the day-to-day output to a very small part of the potential and through conservation of the resources over the past three years, Oklahoma City still promises to be an unusually important source throughout 1933. There is adequate plant capacity there to take care of several times the present volume of gas and with a more liberal attitude justified toward crude production there by the middle of next year, Oklahoma City may be expected to continue as a very important factor.

The Mid-Continent production of natural gasoline has had to be absorbed by local refiners in increasing volumes during the past three years because of the loss of the Gulf Coast refiners as major customers.

There probably will not be any change in this situation during 1933. Because of the nearness of the Conroe and other potential sources of natural gasoline on the Gulf Coast it is logical that refiners there cannot be depended upon as customers in the Mid-Continent in 1933.

However, there is a growing interest in shipments of stabilized natural gasoline from the Gulf Coast for foreign accounts. Russia recently purchased its first cargo of natural gasoline for blending with its refinery gasoline to meet the greatly expanded demands for motor fuel within its own boundaries.

In analyzing the accompanying table showing the production of natural gasoline over the past year, it is interesting to note the uniformity of decline with the single exception of the Oklahoma City Field. California as a state showed a production in 1932 which was only 80 per cent of that for the previous year. Texas showed 82 per cent and Oklahoma 83 per cent. Naturally, a study of the individual fields will not show the same closeness of quantity produced and the older, small settled areas within these states show greatest stability. Of all fields, Seminole in Oklahoma showed the greatest drop. In 1932 this field produced only 60 per cent of the 1931 output. The Osage Field in Oklahoma showed the second largest decline where the output last year was only 71 per cent of that of the previous year. The large decline in these two Oklahoma fields justified the greater output in Oklahoma City. Santa Fe Springs in California is the only other field of great importance to show an abnormally large drop in output.

The older and more settled production in the lesser important states such as Arkansas, Kentucky, Illinois and Indiana showed a relatively large drop.

Texas Commission Hears Arguments to Open Panhandle

AMARILLO, Tex., Feb. 20.—Settlement of the question of opening up the Panhandle gas fields to permit operators to process the gas through natural gasoline plants without the subsequent utilization of the residue gas seemed distant as the result of a meeting here of all interested parties before E. O. Thompson, member of the Texas Railroad Commission, held Saturday. Mr. Thompson was told that if permits were granted well owners and land holders to produce their wells and allow the residue gas to be dissipated in the air many new plants would be erected and some plants now idle would resume operations. The petition to open up the field was presented by Hagy, Harrington and Marsh, operators in the field. It seeks to permit several wells to produce on the same basis as the commission has granted the owners of six "sour gas" wells to produce in another part of the field. If this permission is granted there will be numerous permits filed by companies seeking similar rights and there is little question but that for the time being there will be an additional volume of natural gasoline produced in the area. Some individual operators would no doubt build plants and the operations of some plants now idle would be resumed but there is a question whether the present market price of about 2 cents a gallon could be maintained in the area and even at the present market many contend the operation of the plants would not be profitable.

That the desire to open the field is not fostered by a majority of the interests in the field was evidenced by a petition signed by 138 royalty owners holding 800,000 acres of the 1,200,000 acres involved in which it was asked that the permit not be granted.

Those who attended the hearing were impressed by the apparently confident attitude assumed by those seeking the permit following remarks made by Commissioner Thompson but those who are opposing the permit intimate they are prepared to carry their arguments into the courts.

RUSSIAN CARGO REPORTED

Hanlon-Buchanan, Inc., confirms the sale of a 3,000,000-gallon cargo of Sta-Vol-Ene, their stabilized natural gasoline, to Amtorg Trading Corp., for account of the Russian Soviet government, lifting from their terminal at Goodhope, La., by S. S. "Glittre," March 1.

TREND OF PRODUCTION OF NATURAL GASOLINE IN THE UNITED STATES BY DISTRICTS DURING 1932 AND 1931
(Millions of gallons)

	1932												Total 1932	Total 1931	Pct. 1932 product'n was of '31
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
Appalachian	7.4	7.2	7.8	6.2	4.8	3.7	3.5	3.8	3.8	5.4	6.2	6.9	66.7	72.5	92
Kentucky, Illinois and Indiana	.6	.6	.8	.7	.6	.7	.6	.5	.7	.7	.8	.8	8.1	10.5	77
Oklahoma	36.0	33.6	33.2	33.3	33.4	29.9	29.8	28.7	29.8	31.5	29.9	28.6	377 7	454.9	83
Oklahoma City	7.7	6.5	6.9	7.2	7.1	5.9	5.4	5.5	5.6	6.2	6.6	6.5	77.1	53.5	144
Osage County	4.5	4 0	4.1	3.9	4.0	3.7	3 9	3.6	4.4	4 3	3.7	3.4	47 5	66.7	71
Seminole	10.8	10.4	10 0	10.7	10.1	8.9	8.8	8.6	8.9	9.3	8.1	7.8	112.4	188.7	60
Rest of State	13.0	12.7	12 2	11.5	12.2	11.4	11.7	11.0	10.9	11.7	11.5	10 9	140.7	145.7	96
Kansas	2.6	2.4	2.8	2.2	2.2	1.7	1.6	1.7	1.9	2.2	2.2	24.6	32 7	43.8	75
Texas	31.9	30.1	30.4	29.9	29.7	27.9	28.6	29.3	28.3	29 2	29.5	28.5	352.5	426.7	82
Panhandle	15.6	14.9	15 2	14.4	12.3	13 4	13.6	14.0	13.1	13.6	14.3	14.5	170.8	212.3	80
North Texas	2.2	2 2	2.2	2.1	2.4	2.0	2.1	1.9	2.0	2.0	1.9	1.8	24 8	31.8	78
West Central	5.1	7.6	7.7	7.6	7.2	6.3	6.8	6.8	7.1	7.5	7.3	6.8	86.8	109.7	79
Rest of State	5.1	5.4	5 3	5.8	5.9	6.2	6 1	6.6	6.1	6.2	6.0	5 4	70 1	72.9	96
Louisiana	4.7	4.4	4.4	4.3	4.0	3.8	3.6	3.7	3 5	3.6	3.2	3.2	46.4	58.0	80
Arkansas	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.3	19 4	26.3	74
Rocky Mountain	5.2	4.7	4.9	5.0	5.1	5.2	5.2	5.2	5.7	5.8	5.3	4.7	62.0	70 0	89
California	51.2	47.5	48.8	46.9	47.7	43.5	43.5	44.0	42.3	43.1	41.4	45.1	545.0	680.3	80
Long Beach	9.7	8.9	9.8	9.4	9.5	8.7	8.5	8.5	1.4	2.2	1.3	1.3	17.0	21.1	81
Ventura Avenue	4.4	4.2	3.6	3.0	3.1	2.6	2.8	2.9	10.2	9.5	10.2	13.4	136 3	172.1	79
Huntington Beach	1.4	1.4	1.5	1.5	1.7	1.4	1.4	1.4	8.0	8.0	7.7	7.7	104.4	135.4	77
Kettleman Hills	13.5	12.4	11.8	10.9	11.3	10.2	10.2	10.7	7.7	8.4	7.5	7.5	99.4	123.1	80
Santa Fe Springs	9.4	8.5	8 6	8.7	8.7	8.1	8.2	8.1	3.0	3.2	3.4	3.9	40.1	55.1	73
Rest of State	12.8	13.1	13.5	13.4	13.4	12.4	12.4	12.4	12.0	11.8	11.3	11.3	148 8	173.5	84
Total United States	140.4	132.2	134.2	130.3	129.3	118.1	118.1	118.4	117.3	122.8	119.9	121.3	1,502 4	1,831.9	82
Daily average	4.5	4.6	4.3	4.3	4.2	3 9	3.8	3.8	3.9	4 0	4.0	3.9	4.1	5.0	..
Stocks at end of period	40.0	36.8	39.8	44.6	44.3	34 1	31.8	25.9	24.6	24.2	20.1	18.8	18.8	27.1	70

Gasoline in Oklahoma Makes Minor Advance

(Continued from Page 17)

from the Gulf Coast for export and coastwise movement. It is said that buyers in France and Spain are in the market for additional material and manufacturers expect additional Russian business to be placed during the spring months.

Kerosene and Distillate

The latter part of last week specification 41-43 water white kerosene in sales to the trade dropped to a low of 2⅝ cents with resale material available from several Texas sources at 2½ cents, basis Group 3. The first of the week the product was scarce in Oklahoma.

The furnace oil distillates are easier than they were early in the month. The weather has moderated in the northern states and the rush orders from bulk stations have decreased. Several refiners who now feel that they will have sufficient distillate to finish out the season are offering spot material. This is not so much true in Oklahoma as in some other sections of the Mid-Continent. The 32-36 zero, low flash oil sold as gas oil, is the strongest of the furnace oils at a low of 2⅝ cents. This is also the low of the prime white grades. Other grades are available in Oklahoma as low as 2¼ cents.

Fuels and Gas Oils

Due to the large quantity of material available in East Texas, high cold test gas oils are weak in Oklahoma. The quantity available in Oklahoma is small but when offered it must be sold in competition with East Texas material offered as low as 37½ cents per barrel. The U.G.I. grade has dropped to a low of 1⅞ cents.

All grades of fuel oils are less active with demand centering in the low cold test grades which range from 45 cents for 24-26 to 95 cents for 28-30 zero.

John H. Markham, Jr., Dies of Pneumonia

(Continued from Page 10)

and much of his time thereafter was spent in New York and Chicago.

Born in the Oil Country

John H. Markham, Jr., was born in Karns City, Clarion County, Pennsylvania. His father started in the oil business rafting oil down Oil Creek in Venango County in 1864, later becoming a driller and successful drilling contractor, closing his long years in the oil business as an oil producer in Kansas. The family moved to Bradford when John, Jr., was a small boy and the elder Markham erected a fine residence on Congress Street, which is still occupied by members of the family. John, Jr., was educated in the Bradford public schools, later attending a college in Buffalo, where he took a business course. His schooling finished, he obtained a clerical position with the Eureka Pipe Line Co., in its headquarters in Pittsburgh, but his father prevailed upon him to join him in the oil field and he moved to Kane.

After becoming firmly established as a contractor in the Gulf Coastal fields of Texas, he returned to Kane, where he was united in marriage with Miss Maude Clayson and they resided in Beaumont until Mr. Markham decided to move to Kansas. In the latter state they made their home in Coffeyville, and later moved to Bartlesville, Okla., to be nearer Mr. Markham's operations as an oil producer. From Bartlesville the family moved to Tulsa.

Mr. Markham is survived by his wife and three children, Mrs. Manuel Lloyd Freese, John H. Markham III, and Miss Marjory Markham, and by the following brothers and sisters: Robert E., of Tulsa; Walter, of San Antonio, Tex.; Frances Markham, of New York; Lillian and Jane, of Bradford, Pa.; Mrs. Mabel Simpson, of Tulsa; Mrs. Winifred Washabaugh, of Wichita, Kans., and Mrs. Claire M. Updegrave, of Corry, Pa.

Solemn high mass of requiem was celebrated in Holy Family pro-cathedral in Tulsa Monday morning. The large church was filled, many of those present being leaders in the oil industry from distant cities. The Rt. Rev. Francis Clement Kelly, Bishop of Oklahoma City-Tulsa diocese, delivered the funeral oration, following the mass at which Msgr. James F. McGuire was the celebrant. The body was consigned to rest in Holy Family Cemetery.

The deceased was one of the principal Catholic laymen in the United States and was honored with membership in three old and important Catholic bodies, the Knights of Malta, which dates back to the eleventh century; the Equestrian Order of the Knights of the Holy Sepulchre, instituted in the fifteenth century, and the Knights of St. Gregory. Villa Nova College conferred upon him the honorary degree of doctor of laws.

OIL CHEAPER THAN COAL

NEW YORK, Feb. 20.—Oil shows demonstrable advantages over coal in the Atlantic seaboard territory from the standpoint of economy, efficiency and operating advantages, says E. B. Maynard, manager of the industrial equipment division of Petroleum Heat & Power Co., in an article in the first issue of "New York Building Supervisor," which will appear next week.

Taking average and conservative figures for Greater New York, Mr. Maynard says, anywhere from 10 to 30 per cent more B.t.u.'s can be bought per dollar in oil than can be bought in coal. These percentages are based on average costs which are current today in New York City. For instance, oil at 3½ cents per gallon and buckwheat coal at $6.50 per ton.

Aside from the dollar and cents savings which can be effected with oil fuel, Mr. Maynard concludes, there are the indirect advantages of cleanliness, convenience of delivery and storage, and the maintenance of even temperatures, which are often of far greater importance than the actual economy.

JAMES H. JOWETT DEAD

James H. Jowett, 58, executive vice president and a director of the Ingersoll-Rand Co., with headquarters at 11 Broadway, New York, died last week in Flower Hospital, that city. Mr. Jowett was also vice president and a director of the A. S. Cameron Steam Pump Works and a director of the Rathbun-Jones Engineering Corp. He was a member of the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers.

California Crude Oil Prices

STANDARD OIL CO. OF CALIFORNIA
(Effective June 26, 1932)

For current purchases of crude oil at the well (unless otherwise specified.) (All gravities above those quoted take highest price offered in that field.)

Gravity—	Signal Hill (Long Beach)	Seal Beach, Alamitos Heights, Huntington Beach	Inglewood	Playa Del Rey	Olinda-Brea Canyon	Torrance	Richfield	Coyote Hills	Santa Fe Springs	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Athens, Rosecrans, Dominguez	Montebello	Wheeler Ridge	Coalinga	Whittier-La Habra
14-14.9	$.65	$.65	$.65	$.65	$.65	$.65	$.65	$.65	....	$.55	$.55	....	$.65	$.55	$.55	$.65
15-15.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
16-16.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
17-17.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
18-18.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
19-19.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
20-20.9	.69	.69	.73	.69	.69	.69	.69	.65	....	.59	.59	....	.65	.57	.59	.68
21-21.9	.74	.74	.77	.74	.74	.74	.74	.66	....	.63	.63	....	.67	.60	.62	.72
22-22.9	.79	.79	.82	.78	.79	.79	.79	.70	....	.69	.69	....	.70	.63	.65	.77
23-23.9	.84	.84	.88	.82	.84	.84	.84	.76	....	.75	.75	....	.73	.66	.68	.83
24-24.9	.89	.89	.92	.86	.89	.89	.89	.81	$.73	.81	.81	$.89	.76	.69	.72	.89
25-25.9	.93	.93	....	.91	.93	.93	.93	.86	.79	.87	.87	.93	.80	.72	.75	....
26-26.9	.97	.97	..	.96	.97	..	....	.90	.84	.92	.91	.97	....	....	....	....
27-27.9	1.00	..	....	....	1.00	....	....	.94	.89	.97	.94	1.00	....	....	....	....
28-28.9	1.03	....	....	....	1.03	....	..	.98	.94	1.02	.99	1.03	....	....	....	....
29-29.9	1.06	....	....	....	....	....	....	1.02	.98	1.07	1.02	1.06	....	....	....	....
30-30.9	1.09	....	....	....	....	..	....	1.05	1.02	1.12	1.06	1.09	....	....	....	....
31-31.9	....	....	....	....	....	....	....	....	1.06	....	....	1.12	....	....	....	....
32-32.9	....	....	....	....	....	....	....	....	1.10	....	....	1.16	....	....	....	....
33-33.9	....	....	....	....	....	....	....	....	1.14	....	....	....	....	....	....	....
34-34.9	....	....	....	....	....	....	....	....	1.18	....	....	....	....	....	....	....
35-35.9	....	....	....	....	....	....	....	....	1.22	....	....	....	....	....	....	....

The Texas Company, effective June 24, posted same prices as the Standard Oil Co. in Signal Hill, Alamitos Heights, Huntington Beach, Torrance, Richfield, Montebello, North Whittier and Santa Fe Springs.

The Union Oil Co., effective June 26, posted the same price as the Standard Oil Co. in the Signal Hill, Alamitos Heights, Seal Beach, Huntington Beach, Athens, Rosecrans, Dominguez, Torrance, Santa Fe Springs, Playa Del Rey, Coyote, Olinda, Brea Canyon, Richfield and Montebello. In Coalinga, Lost Hills, Kern River, McKittrick, Midway-Sunset, Elk Hills and Buena Vista Hills the Union Oil Co. met the Standard Oil Co.'s prices from 14 gravity upward, but posted a price of 50 cents for oil 11 to 13.9 degrees in gravity.

General Petroleum adopted Standard Oil Co.'s prices, effective June 26, in Rosecrans, Signal Hill, Alamitos Heights, Santa Fe Springs, Inglewood, Torrance, Brea Canyon and Olinda, up to 35.9 degrees; Richfield, Midway-Sunset, Kern River, Mount Poso, Round Mountain and Coalinga and posted in Rincon as follows: 22-22.9 degrees, 68 cents; 23-23.9 degrees, 73 cents; 24-24.9 degrees, 78 cents; 25-25.9 degrees, 83 cents; 26-26.9 degrees, 86 cents; 27-27.9 degrees, 89 cents; 28-28.9 degrees, 92 cents; 29-29.9 degrees, 95 cents, 30 degrees and over, 98 cents. In Rosecrans, General Petroleum Co. pays 65 cents for 14 to 19.9 gravity oil; 20-20.9 degrees, 69 cents; 21-21.9 degrees, 74 cents; 22-22.9 degrees, 79 cents; 23-23.9 degrees, 85 cents, and Standard's prices for oil of higher gravity.

Associated Oil Co., effective June 26, met Standard Oil Co.'s prices in Signal Hill, Huntington Beach, Seal Beach, Alamitos Heights, Richfield, Torrance, Inglewood, Athens, Rosecrans, Dominguez, Santa Fe Springs, McKittrick, Kern River, Midway-Sunset, Elk Hills, Buena Vista Hills, Lost Hills, Belridge and Coalinga.

Kettleman Hills—The Union Oil Co., effective June 26, posted 33-33.9 gravity oil at 91 cents; 34-34.9 degrees, 93 cents; 35-35.9 degrees, 95 cents; 36-36.9 degrees, 97 cents; 37-37.9 degrees, 99 cents; 38-38.9 degrees, $1.01; 39 degrees and over, $1.03. Standard Oil Co., Associated Oil Co. and General Petroleum Co. adopted same price schedule on same day.

Santa Paula—The Union Oil Co. and The Texas Company, effective June 26, posted as follows: 14 degrees to 19.9 degrees, 66 cents; 20-20.9 degrees, 69 cents; 21-21.9 degrees, 72 cents; 22-22.9 degrees, 75 cents; 23-23.9 degrees, 78 cents; 24-24.9 degrees, 81 cents; 25-25.9 degrees, 84 cents; 26-26.9 degrees, 87 cents; 27-27.9 degrees, 90 cents; 28-28.9 degrees, 93 cents; 29 degrees and above, 99 cents.

Shields Canyon and South Mountain—The Texas Company, effective June 26, posted same prices as in Santa Paula.

Orcutt—The Union Oil Co., effective June 26, posted prices as follows: 16 degrees to 19.9 degrees, 55 cents; 20-20.9 degrees, 59 cents; 21-21.9 degrees, 63 cents; 22-22.9 degrees, 69 cents; 23-23.9 degrees, 75 cents; 24-24.9 degrees, 81 cents; 25-25.9 degrees, 87 cents; 26 degrees and above, 92 cents.

Playa Del Rey—Subject to a field gathering charge of 5 cents per barrel.

Newhall, McKittrick and Kern River—Standard Oil Co., effective June 23, 1931, posted 55 cents for oil of all grades.

Elwood Terrace—Standard Oil Co., effective June 26, 1932, posts 32-32.9 degrees, $1.04; 34-34.9 degrees, $1.10; 35-35.9 degrees, $1.16; 36-36.9 degrees, $1.22; 37-37.9 degrees, $1.28. All prices f.o.b. ships.

Ventura Avenue—General Petroleum Co. and Associated Oil Co. effective June 26 posted as follows: 22-22.9 degrees, 72 cents; 23-23.9 degrees, 77 cents; 24-24.9 degrees, 82 cents; 25-25.9 degrees, 86 cents; 26-26.9 degrees, 90 cents; 27-27.9 degrees, 93 cents; 28-28.9 degrees, 96 cents; 29-29.9 degrees, 99 cents; 30 degrees and over, $1.02.

Potrero—Associated Oil Co., effective June 26, posted same prices as are paid by all companies in Athens, Rosecrans and Dominguez.

Crude Oil Prices

(Continued from Page 21)

Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.17
Penna Grade Oil in Bureka Pipe Line Lines	1.13
Penna Grade Oil in Buckeye Pipe Line Lines	.97
Corning Grade Oil in Buckeye Pipe Line Co.'s line (Jan. 20, 1933)	.70
Ragland Grade Oil in Cumberland Pipe Lines (Kentucky) (Jan. 16, 1931)	.60

PENNZOIL CO.
(Effective January 21, 1933)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	$1.62
Includes Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	1.61
Includes Titusville district.	
Group C	1.60
Includes Turkey and Tidioute districts.	
Group D	1.59
Includes Bear Creek and Perkey districts.	
Group E	1.57
Includes Eldenau, Bull Creek, Rough Run, Carbon, Dipner, Bredin, McJunkin, Jameson, Kennerdell, Emlenton, Tiona, Lacy and Kinzua districts.	
Price depends on length of pipe line haul to plant at Oil City.	

TIDE WATER PIPE CO.
(Effective January 21, 1933)

Bradford, Pa.	$1.47
Allegany, N. Y.	1.47

PURE OIL CO.
(Effective January 21, 1933)

Cabin Creek, W. Va.	$1.13
Bradford Hollow, W. Va.	1.13
Kelly's Creek, W. Va.	1.13

Middle Western States

OHIO OIL CO.
(Effective January 18, 1933)

Lima (Jan. 10, 1933)	$ .70
Wooster	.70
Illinois	.62
Indiana	.60
Princeton	.62
Plymouth	Shut in
Western Kentucky	.57
Midland, Mich. (Dec. 31, 1932)*	.96
Somerset, Ky. (Jan. 19, 1933)	.45
Muskegon, Mich. (Jan. 18)	See note

*Posted by Pure Oil Co. Producers Pipe Line Co. pays 5 cents per barrel over Pure Oil Co.'s posted price. Muskegon posted by Naph Sol Refining Co. and Old Dutch Refining Co.: Below 29 degrees, 51 cents, with 2 cents added for each degree upward to 40 and above at 75 cents. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and delivered through own pipe line.

Mexico

Panuco*	$ .44

*F.o.b. ship, based on January transactions and exclusive of production and export taxes and bar dues.

Canada

Ontario (Jan. 18, 1933):	
Petrolia*	$1.75
Oil Springs*	1.82
Alberta (Apr. 22, 1932):	
Turner Valley†:	
Crude oil 40-44.9	1.56
Crude oil 45-45.9	2.13
Crude oil 50 and above	2.50
Crude naphtha	3.32
Discolored naphtha	3.08

*Imperial Oil, Ltd. †Imperial Oil, Ltd., and Regal Oil & Refining Co

NATURAL GASOLINE MANUFACTURE

Adoption of Tax May Cause Some Plants to Close

The operation of many Oklahoma natural gasoline plants is being threatened by the one-half cent per 1,000 feet tax proposed on gas produced as provided for in House Bill 248 now in the hands of the state oil and gas committee. The tax will be paid by the producer, but the proposed levy is in excess of what he receives for his gas and, since there is no market for the existing supply, there is little chance of passing on the added weight. If the bill is passed in its present form it will work serious hardships on the natural gasoline industry even though that industry is not concerned with the payment of the tax and some of the inequalities in the bill from the standpoint of the plant operator will prove this point.

It will be remembered that the bill provides for a tax of one-half cent per 1,000 feet of gas produced regardless of how the gas is utilized. Justification for the tax apparently lies in the fact the gas may be processed to recover marketable products. However, the bill fails to recognize the fact that the quality of gas varies greatly.

An example of the actual application of the tax will serve to show the inequalities in the proposal. At present approximately 75 per cent of the marketable casinghead gas in Oklahoma is sold on contract and only 25 per cent is processed in the producers' own plants. The average royalty payment made by the plant to the producer is from 10 to 15 per cent of the value of the natural gasoline extracted. This arrangement is provided for through a standard form of contract that is in general use. The average gasoline content of such gas in Oklahoma is 1.4 gallons per 1,000 feet and the present spot price is 2 cents per gallon. On this basis, the producer now receives 10 per cent of 2.8 cents, or .28 cent, as his pay for the gas, and if the bill is passed he will be obligated to the State to pay .5 cent, or nearly twice as much as he receives.

In those field such as that at Oklahoma City, where the gas contains but one-half gallon per thousand, the amount received by the producer on contract is only 5 per cent of the value of the products, except where well pressure is sufficiently high to permit processing without boosting. In the latter case the buyer receives an additional 5 per cent. However, where the producer does not receive this added amount he will receive 5 per cent of 1 cent, or .05 cent, and he will be paying a tax of 10 times this amount.

All Fields Show a Reduction in Natural Gasoline Yield Except Oklahoma City

Except for the Oklahoma City Field, every important area contributing to the production of natural gasoline showed a marked decrease in the output during 1932 compared to that of 1931. The decline for the country approximated 329,500,000 gallons. The output during the past year was only 82 per cent of that for 1931. Production was decreased to the point where stocks also were materially reduced, the stocks on the first of January of last year approximating 27,100,000 gallons while stocks on the first of this year were 18,800,000 gallons, according to the Bureau of Mines.

These facts permit a rather optimistic view to be taken regarding 1933. The industry is in a favorable statistical position at present, has shown its ability to adjust its operations to changing market demands, is not threatened with known, uncontrolled, flush fields which yield a large volume of wet gas and conditions have so shaped themselves outside the industry as to indicate natural gasoline will assume a more important role as a constituent of motor fuel over the immediate future.

The only area which may prove a disturbing source of natural gasoline for 1933 are those fields along the Gulf Coast which have been proved to the extent of one or two wells but whose real potential production of both crude oil and wet gas remains uncertain. The area which will command immediate attention in this respect is Conroe. A 10-inch gas line is now under construction which will reach from the field to Houston and although the oil production will no doubt be held back by proration, there promises to be room for gasoline plants having a total capacity of 100,000,000 feet within the very near future. The gas will make about 1 gallon of natural gasoline per thousand feet and has no unusual characteristics that would limit its usefulness.

In California there are several fields which could materially increase their output of natural gasoline at any time proration is moderated, but each of these, with the exception of the Kettleman Hills Field has shown definite signs of natural decline.

The only important field in the Mid-Continent area which apparently will continue to produce a large quantity of natural gasoline throughout the coming year is the Oklahoma City Field. Here proration has decreased the day-to-day output to a very small part of the potential and through conservation of the resources over the past three years, Oklahoma City still promises to be an unusually important source throughout 1933. There is adequate plant capacity there to take care of several times the present volume of gas and with a more liberal attitude justified toward crude production there by the middle of next year, Oklahoma City may be expected to continue as a very important factor.

The Mid-Continent production of natural gasoline has had to be absorbed by local refiners in increasing volumes during the past three years because of the loss of the Gulf Coast refiners as major customers.

There probably will not be any change in this situation during 1933. Because of the nearness of the Conroe and other potential sources of natural gasoline on the Gulf Coast it is logical that refiners there cannot be depended upon as customers in the Mid-Continent in 1933.

However, there is a growing interest in shipments of stabilized natural gasoline from the Gulf Coast for foreign accounts. Russia recently purchased its first cargo of natural gasoline for blending with its refinery gasoline to meet the greatly expanded demands for motor fuel within its own boundaries.

In analyzing the accompanying table showing the production of natural gasoline over the past year, it is interesting to note the uniformity of decline with the single exception of the Oklahoma City Field. California as a state showed a production in 1932 which was only 80 per cent of that for the previous year. Texas showed 82 per cent and Oklahoma 83 per cent. Naturally, a study of the individual fields will not show the same closeness of quantity produced and the older, small settled areas within these states show greatest stability. Of all fields, Seminole in Oklahoma showed the greatest drop. In 1932 this field produced only 60 per cent of the 1931 output. The Osage Field in Oklahoma showed the second largest decline where the output last year was only 71 per cent of that of the previous year. The large decline in these two Oklahoma fields justified the greater output in Oklahoma City. Santa Fe Springs in California is the only other field of great importance to show an abnormally large drop in output.

The older and more settled production in the lesser important states such as Arkansas, Kentucky, Illinois and Indiana showed a relatively large drop.

Texas Commission Hears Arguments to Open Panhandle

AMARILLO, Tex., Feb. 20. — Settlement of the question of opening up the Panhandle gas fields to permit operators to process the gas through natural gasoline plants without the subsequent utilization of the residue gas seemed distant as the result of a meeting here of all interested parties before E. O. Thompson, member of the Texas Railroad Commission, held Saturday. Mr. Thompson was told that if permits were granted well owners and land holders to produce their wells and allow the residue gas to be dissipated in the air many new plants would be erected and some plants now idle would resume operations. The petition to open up the field was presented by Hagy, Harrington and Marsh, operators in the field. It seeks to permit several wells to produce on the same basis as the commission has granted the owners of six "sour gas" wells to produce in another part of the field. If this permission is granted there will be numerous permits filed by companies seeking similar rights and there is little question but that for the time being there will be an additional volume of natural gasoline produced in the area. Some individual operators would no doubt build plants and the operations of some plants now idle would be resumed but there is a question whether the present market price of about 2 cents a gallon could be maintained in the area and even at the present market many contend the operation of the plants would not be profitable.

That the desire to open the field is not fostered by a majority of the interests in the field was evidenced by a petition signed by 138 royalty owners holding 800,000 acres of the 1,200,000 acres involved in which it was asked that the permit not be granted.

Those who attended the hearing were impressed by the apparently confident attitude assumed by those seeking the permit following remarks made by Commissioner Thompson but those who are opposing the permit intimate they are prepared to carry their arguments into the courts.

RUSSIAN CARGO REPORTED

Hanlon-Buchanan, Inc., confirms the sale of a 3,000,000-gallon cargo of Sta-Vol-Ene, their stabilized natural gasoline, to Amtorg Trading Corp., for account of the Russian Soviet government, lifting from their terminal at Goodhope, La., by S. S. "Glittre," March 1.

TREND OF PRODUCTION OF NATURAL GASOLINE IN THE UNITED STATES BY DISTRICTS DURING 1932 AND 1931
(Millions of gallons)

	1932												Total 1932	Total 1931	Pct. 1932 product'n was of '31
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
Appalachian	7.4	7.2	7.8	6.2	4.8	3.7	3.5	3.8	3.8	5.4	6.2	6.9	66.7	72.5	92
Kentucky, Illinois and Indiana	.6	.6	.8	.7	.6	.7	.6	.5	.7	.7	.8	.8	8.1	10.5	77
Oklahoma	36.0	33.6	33.2	33.3	33.4	29.9	29.8	28.7	29.8	31.5	29.9	28.6	377 7	454.9	83
Oklahoma City	7.7	6.5	6.9	7.2	7.1	5.9	5.4	5.5	5.6	6.2	6.6	6.5	77.1	53.8	144
Osage County	4.5	4.0	4.1	3.9	4.0	3.7	3 9	3.6	4.4	4 3	3.7	3.4	47 5	66.7	71
Seminole	10.8	10.4	10.0	10.7	10.1	8.9	8.8	8.6	8.9	9.3	8.1	7.8	112.4	188.7	60
Rest of State	13.0	12.7	12 2	11.5	12.2	11.4	11.7	11.0	10.9	11.7	11.5	10 9	140.7	145.7	96
Kansas	2.6	2.4	2.3	2.2	2.2	1.7	1.6	1.6	1.7	1.9	2.2	2.2	24.6	32 7	75
Texas	31.0	30.1	30.4	29.9	29.7	27.9	28.6	29.3	28.3	29 3	29.5	28.5	352.5	426.7	82
Panhandle	15.6	14.9	15 2	14.4	13.2	13 4	13.6	14.0	13.1	13.6	14.2	14.5	170.8	212.3	80
North Texas	2.2	2 2	2.2	2.1	2.4	2.0	2.1	1.9	2.0	2.0	1.9	1.8	24 8	31.8	78
West Central	8.1	7.6	7.7	7.6	7.2	6.3	6.3	6.8	7.1	7.5	7.3	6.8	86.8	109.7	79
Rest of State	5.1	5.4	5 3	5.8	5.9	6.2	6 1	6.6	6 1	6.2	6.0	5 4	70.1	72.9	96
Louisiana	4.7	4.4	4.4	4.3	4.0	3.8	3.6	3.7	3 5	3.6	3.2	3.2	46.4	58.0	80
Arkansas	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.3	19 4	26.3	74
Rocky Mountain	5.2	4.7	4.9	5.0	5.1	5.2	5.2	5.2	5.7	5.8	5.3	4.7	62.0	70 0	89
California	51.2	47.5	48.8	46.9	47.7	43.5	43.5	44.0	42.3	43.1	41.4	45.1	545.0	680.3	80
Long Beach	9.7	8.9	9.8	9.4	9.6	8.7	8.5	8.5	1.4	2.2	1.3	1.3	17.0	21.1	81
Ventura Avenue	4.4	4.2	3.6	3.0	3.1	2.6	2.8	2.9	10.2	9.5	10.2	13.4	135 3	172.1	79
Huntington Beach	1.4	1.4	1.5	1.5	1.7	1.4	1.4	1.4	8.0	8.0	7.7	7.7	104.4	135.4	77
Kettleman Hills	13.5	12.4	11.8	10.9	11.3	10.3	10.2	10.7	7.7	8.4	7.5	7.5	99.4	123.1	80
Santa Fe Springs	9.4	8.5	8 6	8.7	8.7	8.1	8.2	8.1	3.0	3.2	3.4	3.9	40.1	55.1	73
Rest of State	13.8	12.1	13.5	13.4	13.4	12.4	12.4	12.4	12.0	11.8	11.3	11.3	148.8	173.5	84
Total United States	140.4	132.2	134.3	130.3	129.3	118.1	118.1	118.4	117.3	122.8	119.9	121.3	1,502 4	1,831.9	82
Daily average	4.5	4.6	4.3	4 3	4.2	3 9	3.8	3.8	3.9	4 0	4.0	3.9	4.1	5.0	...
Stocks at end of period	40.0	36.8	39.8	44.6	44.3	34.1	31.8	25.9	24.6	24.2	20.1	18.8	18.8	27.1	70

Gasoline in Oklahoma Makes Minor Advance

(Continued from Page 17)

from the Gulf Coast for export and coastwise movement. It is said that buyers in France and Spain are in the market for additional material and manufacturers expect additional Russian business to be placed during the spring months.

Kerosene and Distillate

The latter part of last week specification 41-43 water white kerosene in sales to the trade dropped to a low of 2⅝ cents with resale material available from several Texas sources at 2½ cents, basis Group 3. The first of the week the product was scarce in Oklahoma.

The furnace oil distillates are easier than they were early in the month. The weather has moderated in the northern states and the rush orders from bulk stations have decreased. Several refiners who now feel that they will have sufficient distillate to finish out the season are offering spot material. This is not so much true in Oklahoma as in some other sections of the Mid-Continent. The 32-36 zero, low flash oil sold as gas oil, is the strongest of the furnace oils at a low of 2⅝ cents. This is also the low of the prime white grades. Other grades are available in Oklahoma as low as 2¼ cents.

Fuels and Gas Oils

Due to the large quantity of material available in East Texas, high cold test gas oils are weak in Oklahoma. The quantity available in Oklahoma is small but when offered it must be sold in competition with East Texas material offered as low as 37½ cents per barrel. The U.G.I. grade has dropped to a low of 1⅜ cents.

All grades of fuel oils are less active with demand centering in the low cold test grades which range from 45 cents for 24-26 to 95 cents for 28-30 zero.

John H. Markham, Jr., Dies of Pneumonia

(Continued from Page 10)

and much of his time thereafter was spent in New York and Chicago.

Born in the Oil Country

John H. Markham, Jr., was born in Karns City, Clarion County, Pennsylvania. His father started in the oil business rafting oil down Oil Creek in Venango County in 1864, later becoming a driller and successful drilling contractor, closing his long years in the oil business as an oil producer in Kansas. The family moved to Bradford when John, Jr., was a small boy and the elder Markham erected a fine residence on Congress Street, which is still occupied by members of the family. John, Jr., was educated in the Bradford public schools, later attending a college in Buffalo, where he took a business course. His schooling finished, he obtained a clerical position with the Eureka Pipe Line Co., in its headquarters in Pittsburgh, but his father prevailed upon him to join him in the oil field and he moved to Kane.

After becoming firmly established as a contractor in the Gulf Coastal fields of Texas, he returned to Kane, where he was united in marriage with Miss Maude Clayson and they resided in Beaumont until Mr. Markham decided to move to Kansas. In the latter state they made their home in Coffeyville, and later moved to Bartlesville, Okla., to be nearer Mr. Markham's operations as an oil producer. From Bartlesville the family moved to Tulsa.

Mr. Markham is survived by his wife and three children, Mrs. Manuel Lloyd Freese, John H. Markham III, and Miss Marjory Markham, and by the following brothers and sisters: Robert E., of Tulsa; Walter, of San Antonio, Tex.; Frances Markham, of New York; Lillian and Jane, of Bradford, Pa.; Mrs. Mabel Simpson, of Tulsa; Mrs. Winifred Washabaugh, of Wichita, Kans., and Mrs. Claire M. Updegrave, of Corry, Pa.

Solemn high mass of requiem was celebrated in Holy Family pro-cathedral in Tulsa Monday morning. The large church was filled, many of those present being leaders in the oil industry from distant cities. The Rt. Rev. Francis Clement Kelly, Bishop of Oklahoma City-Tulsa diocese, delivered the funeral oration, following the mass at which Msgr. James F. McGuire was the celebrant. The body was consigned to rest in Holy Family Cemetery.

The deceased was one of the principal Catholic laymen in the United States and was honored with membership in three old and important Catholic bodies, the Knights of Malta, which dates back to the eleventh century; the Equestrian Order of the Knights of the Holy Sepulchre, instituted in the fifteenth century, and the Knights of St. Gregory. Villa Nova College conferred upon him the honorary degree of doctor of laws.

OIL CHEAPER THAN COAL

NEW YORK, Feb. 20.—Oil shows demonstrable advantages over coal in the Atlantic seaboard territory from the standpoint of economy, efficiency and operating advantages, says E. B. Maynard, manager of the industrial equipment division of Petroleum Heat & Power Co., in an article in the first issue of "New York Building Supervisor," which will appear next week.

Taking average and conservative figures for Greater New York, Mr. Maynard says, anywhere from 10 to 30 per cent more B.t.u.'s can be bought per dollar in oil than can be bought in coal. These percentages are based on average costs which are current today in New York City. For instance, oil at 3½ cents per gallon and buckwheat coal at $6.50 per ton.

Aside from the dollar and cents savings which can be effected with oil fuel, Mr. Maynard concludes, there are the indirect advantages of cleanliness, convenience of delivery and storage, and the maintenance of even temperatures, which are often of far greater importance than the actual economy.

JAMES H. JOWETT DEAD

James H. Jowett, 58, executive vice president and a director of the Ingersoll-Rand Co., with headquarters at 11 Broadway, New York, died last week in Flower Hospital, that city. Mr. Jowett was also vice president and a director of the A. S. Cameron Steam Pump Works and a director of the Rathbun-Jones Engineering Corp. He was a member of the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers.

California Crude Oil Prices

STANDARD OIL CO. OF CALIFORNIA
(Effective June 26, 1933)

For current purchases of crude oil at the well (unless otherwise specified.) (All gravities above those quoted take highest price offered in that field.)

Gravity—	Signal Hill (Long Beach)	Seal Beach, Alamitos Heights, Huntington Beach	Inglewood	Playa Del Rey	Olinda-Brea Canyon	Torrance	Richfield	Coyote Hills	Santa Fe Springs	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Athens, Rosecrans, Dominguez	Montebello	Wheeler Ridge	Coalinga	Whittier-La Habra
14-14.9	$.65	$.65	$.65	$.65	$.65	$.65	$.65	$.65	....	$.55	$.55	....	$.65	$.55	$.55	$.65
15-15.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
16-16.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
17-17.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
18-18.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.55	.55	..	.65	.55	.55	.65
19-19.9	.65	.65	.65	.65	.65	.65	.65	.65	....	.56	.55	..	.65	.55	.55	.65
20-20.9	.69	.69	.71	.69	.69	.69	.69	.65	....	.59	.59	....	.65	.57	.59	.68
21-21.9	.74	.74	.77	.74	.74	.74	.74	.66	....	.63	.63	....	.67	.60	.62	.72
22-22.9	.79	.79	.82	.78	.79	.79	.79	.70	....	.69	.69	....	.70	.63	.65	.77
23-23.9	.84	.84	.88	.82	.84	.84	.84	.76	....	.75	.75	....	.73	.66	.68	.83
24-24.9	.89	.89	.92	.86	.89	.89	.89	.81	$.73	.81	.81	$.89	.76	.69	.72	.89
25-25.9	.93	.93	....	.91	.93	.93	.93	.86	.79	.87	.87	.93	.80	.72	.75	....
26-26.9	.97	.97	..	.96	.97	..	....	.90	.84	.92	.91	.97	....	....	....	....
27-27.9	1.00	..	....	....	1.00	....	....	.94	.89	.97	.94	1.00	....	....	....	....
28-28.9	1.03	....	....	....	1.03	....	....	.98	.94	1.02	.99	1.03	....	....	....	....
29-29.9	1.06	....	....	....	....	....	....	1.02	.98	1.07	1.02	1.06	....	....	....	....
30-30.9	1.09	....	....	....	....	....	....	1.05	1.02	1.12	1.05	1.09	....	....	....	....
31-31.9	....	....	....	....	....	....	....	....	1.06	....	....	1.12	....	....	....	....
32-32.9	....	....	....	....	....	....	....	....	1.10	....	....	1.15	....	....	....	....
33-33.9	....	....	....	....	....	....	....	....	1.14	....	....	....	....	....	....	....
34-34.9	....	....	....	....	....	....	....	....	1.18	....	....	....	....	....	....	....
35-35.9	....	....	....	....	....	....	....	....	1.22	....	....	....	....	....	....	....

The Texas Company, effective June 26, posted same prices as the Standard Oil Co. in Signal Hill, Alamitos Heights, Huntington Beach, Torrance, Richfield, Montebello, North Whittier and Santa Fe Springs.

The Union Oil Co., effective June 26, posted the same price as the Standard Oil Co. in the Signal Hill, Alamitos Heights, Seal Beach, Huntington Beach, Athens, Rosecrans, Dominguez, Torrance, Santa Fe Springs, Playa Del Rey, Coyote, Olinda, Brea Canyon, Richfield and Montebello. In Coalinga, Lost Hills, Kern River, McKittrick, Midway-Sunset, Elk Hills and Buena Vista Hills the Union Oil Co. met the Standard Oil Co.'s prices from 14 gravity upward, but posted a price of 50 cents for oil 11 to 13.9 degrees in gravity.

General Petroleum adopted Standard Oil Co.'s prices, effective June 26, in Rosecrans, Signal Hill, Alamitos Heights, Santa Fe Springs, Inglewood, Torrance, Brea Canyon and Olinda, up to 25.9 degrees; Richfield, Midway-Sunset, Kern River, Mount Poso, Round Mountain and Coalinga, and posted in Rincon as follows: 22-22.9 degrees, 65 cents; 23-23.9 degrees, 72 cents; 24-24.9 degrees, 78 cents; 25-25.9 degrees, 82 cents; 26-26.9 degrees, 86 cents; 27-27.9 degrees, 89 cents; 28-28.9 degrees, 93 cents; 29-29.9 degrees, 95 cents, 30 degrees and over, 98 cents. In Rosecrans, General Petroleum Co. pays 65 cents for 14 to 19.9 gravity oil; 20-20.9 degrees, 69 cents; 21-21.9 degrees, 74 cents; 22-22.9 degrees, 79 cents; 23-23.9 degrees, 85 cents, and Standard's prices for oil of higher gravity.

Associated Oil Co., effective June 26, met Standard Oil Co.'s prices in Signal Hill, Huntington Beach, Seal Beach, Alamitos Heights, Richfield, Torrance, Inglewood, Athens, Rosecrans, Dominguez, Santa Fe Springs, McKittrick, Kern River, Midway-Sunset, Elk Hills, Buena Vista Hills, Lost Hills, Beiridge and Coalinga.

Kettleman Hills—The Union Oil Co., effective June 26, posted 33-33.9 gravity oil at 91 cents; 34-34.9 degrees, 93 cents; 35-35.9 degrees, 95 cents; 36-36.9 degrees, 97 cents; 37-37.9 degrees, 99 cents; 38-38.9 degrees, $1.01; 39 degrees and over, $1.03. Standard Oil Co., Associated Oil Co. and General Petroleum Co. adopted same price schedule on same day.

Santa Paula—The Union Oil Co. and The Texas Company, effective June 26, posted as follows: 14 degrees to 19.9 degrees, 66 cents; 20-20.9 degrees, 69 cents; 21-21.9 degrees, 73 cents; 22-22.9 degrees, 75 cents; 23-23.9 degrees, 78 cents; 24-24.9 degrees, 81 cents; 25-25.9 degrees, 84 cents; 26-26.9 degrees, 87 cents; 27-27.9 degrees, 90 cents; 28-28.9 degrees, 93 cents; 29 degrees and above, 99 cents.

Shields Canyon and South Mountain—The Texas Company, effective June 26, posted same prices as in Santa Paula.

Orcutt—The Union Oil Co., effective June 26, posted prices as follows: 16 degrees to 19.9 degrees, 55 cents; 20-20.9 degrees, 59 cents; 21-21.9 degrees, 63 cents; 22-22.9 degrees, 69 cents; 23-23.9 degrees, 75 cents; 24-24.9 degrees, 81 cents; 25-25.9 degrees, 87 cents; 26 degrees and above, 93 cents.

Playa Del Rey—Subject to a field gathering charge of 5 cents per barrel.

Newhall, McKittrick and Kern River—Standard Oil Co., effective June 23, 1931, posted 55 cents for oil of all grades.

Elwood Terrace—Standard Oil Co., effective June 26, 1933, posts 33-33.9 degrees, $1.04; 34-34.9 degrees, $1.10; 35-35.9 degrees, $1.16; 36-36.9 degrees, $1.22; 37-37.9 degrees, $1.28. All prices f.o.b. ships.

Ventura Avenue—General Petroleum Co. and Associated Oil Co. effective June 26 posted as follows: 22-22.9 degrees, 72 cents; 23-23.9 degrees, 77 cents; 24-24.9 degrees, 82 cents; 25-25.9 degrees, 86 cents; 26-26.9 degrees, 90 cents; 27-27.9 degrees, 93 cents; 28-28.9 degrees, 96 cents; 29-29.9 degrees, 99 cents; 30 degrees and over, $1.02.

Potrero—Associated Oil Co., effective June 26, posted same prices as are paid by all companies in Athens, Rosecrans and Dominguez.

Crude Oil Prices

(Continued from Page 21)

Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.17
Penna. Grade Oil in Bureka Pipe Line Lines	1.13
Penna Grade Oil in Buckeye Pipe Line Lines	.97
Corning Grade Oil in Buckeye Pipe Line Co.'s line (Jan. 20, 1933)	.79
Ragland Grade Oil in Cumberland Pipe Lines (Kentucky) (Jan. 18, 1931)	.44

PENNZOIL CO.
(Effective January 21, 1933)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	$1.43
Includes Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	1.41
Includes Titusville district.	
Group C	1.40
Includes Turkey and Tidioute districts.	
Group D	1.39
Includes Bear Creek and Porkey districts.	
Group E	1.37
Includes Eldenau, Bull Creek, Rough Run, Carbon, Dipner, Bredin, McJunkin, Jameson, Kennerdell, Emlenton, Tiona, Lacey and Kinsua districts.	
Price depends on length of pipe line haul to plant at Oil City.	

TIDE WATER PIPE CO.
(Effective January 21, 1933)

Bradford, Pa.	$1.47
Allegany, N. Y.	1.47

PURE OIL CO.
(Effective January 21, 1933)

Cabin Creek, W. Va.	$1.13
Bradford Hollow, W. Va.	1.13
Kelly's Creek, W. Va.	1.13

Middle Western States

OHIO OIL CO.
(Effective January 19, 1933)

Lima (Jan. 10, 1933)	$ .70
Wooster	.70
Illinois	.63
Indiana	.40
Princeton	.63
Plymouth	Shut In
Western Kentucky	.57
Midland, Mich. (Dec. 21, 1932)*	.94
Somerset, Ky. (Jan. 19, 1933)	.46
Muskegon, Mich. (Jan. 18)	See note

*Posted by Pure Oil Co. Producers Pipe Line Co. pays 5 cents per barrel over Pure Oil Co.'s posted price. Muskegon posted by Naph Sol Refining Co. and Old Dutch Refining Co.: Below 29 degrees, 51 cents, with 2 cents added for each degree upward to 40 and above at 75 cents. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and delivered through own pipe line.

Mexico

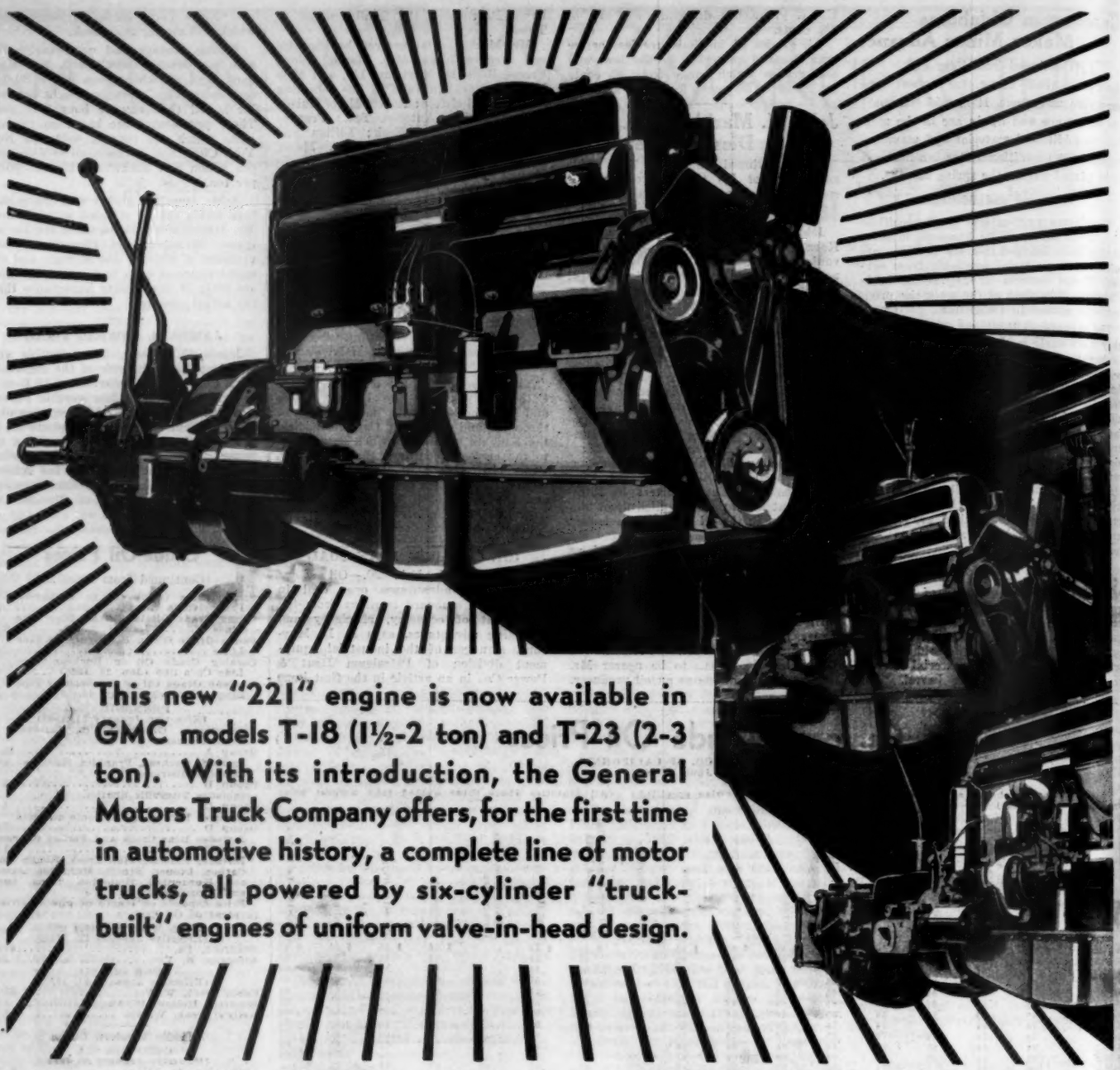
Panuco*	$ .44

*F.o.b. ship, based on January transactions and exclusive of production and export taxes and bar dues.

Canada

Ontario (Jan. 18, 1933):	
Petrolia*	$1.75
Oil Springs*	1.82
Alberta (Apr. 22, 1932):	
Turner Valley†:	
Crude oil 40-44.9	1.56
Crude oil 45-45.9	2.15
Crude oil 50 and above	2.50
Crude naphtha	3.32
Discolored naphtha	2.08

*Imperial Oil, Ltd. †Imperial Oil, Ltd., and Regal Oil & Refining Co



This new "221" engine is now available in GMC models T-18 (1½-2 ton) and T-23 (2-3 ton). With its introduction, the General Motors Truck Company offers, for the first time in automotive history, a complete line of motor trucks, all powered by six-cylinder "truck-built" engines of uniform valve-in-head design.

Features of the 1933 Engine Line

Eight great engines are pictured on this page. They range in cubic inch displacement from 221 to 707; in horsepower, from 69 to 173; and in torque, from 155 to 550 ft. lbs. They are uniform in design, uniform in the standards to which they are built, uniform in their ideal graduation of size and power; and they also possess in common, one outstanding characteristic — unsurpassed engine efficiency—because every 1933 GMC engine provides more sustained torque per cubic inch displacement than does any other truck engine built.

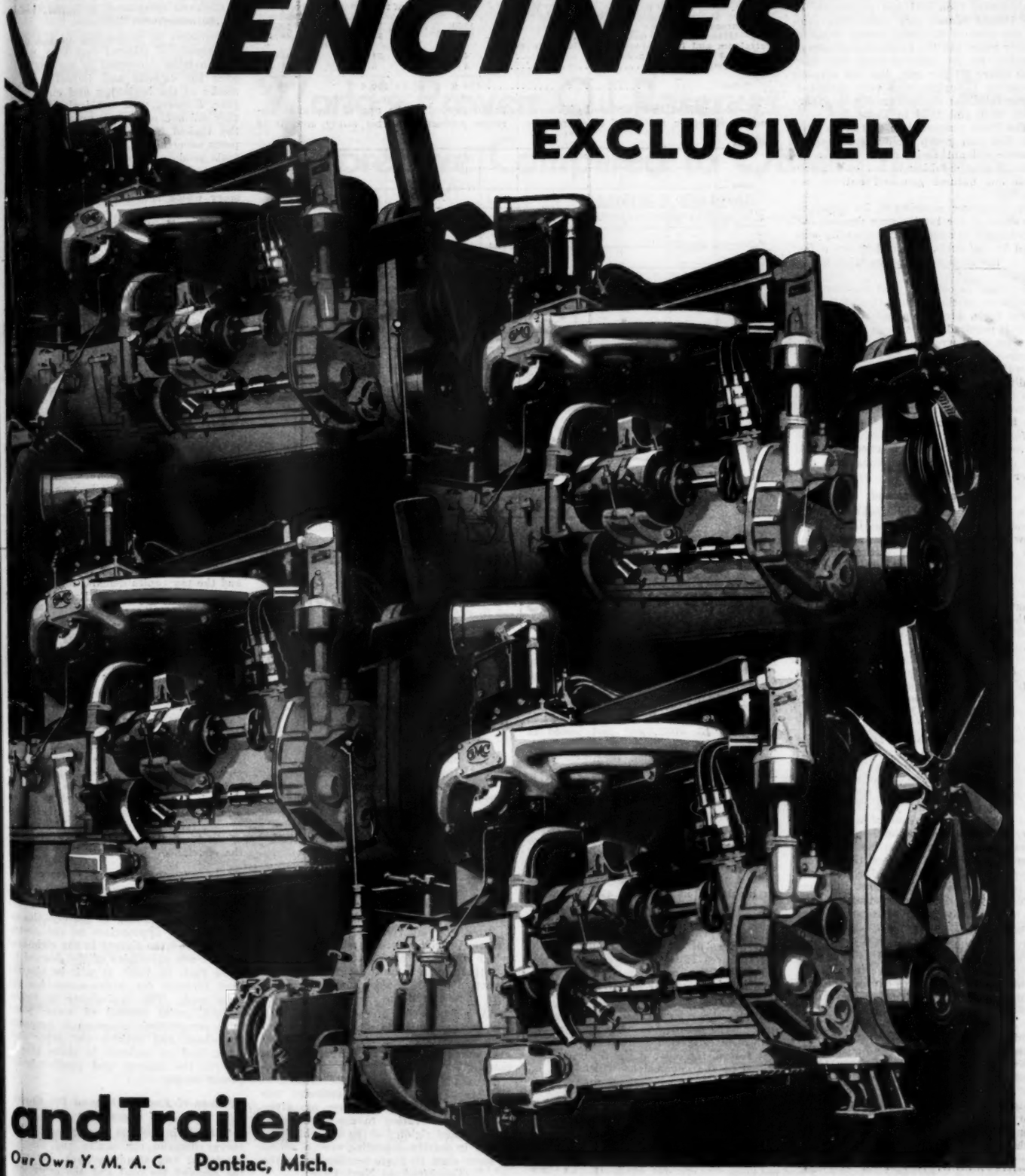
Contributing to this spectacular achievement are many features of advanced engineering design and construction.

But only an actual demonstration can tell you how much these improvements will mean to you. Get that demonstration today!

GENERAL MOTORS TRUCKS

General Motors Truck Co. *(A Subsidiary of Yellow Truck & Coach Mfg. Co.)* *Time Payments Available Through*

POWERED BY "TRUCK GMC BUILT" ENGINES EXCLUSIVELY



and Trailers

Our Own Y. M. A. C. Pontiac, Mich.

Competitive Relationship of Coal and Petroleum in the United States Forecast to Year 1950

By W. SPENCER HUTCHINSON[1] and AUGUST J. BREITENSTEIN[2]

[1]Professor of Mining, Massachusetts Institute of Technology. [2]Assistant Engineer, Philadelphia & Reading Coal & Iron Co.*

The chief sources of energy today are the mineral fuels,coal and petroleum. In the United States they yield more than 90 per cent of the total energy demand. Thirty years ago the proportion of energy supplied by the mineral fuels was likewise above 90 per cent, but the division according to origin was very different. These relations are shown for the years 1900, 1930 and 1950 in Table 1.

The fuels comprised in this study are: (1) The coal group including both bituminous and anthracite coal; (2) the petroleum group, taking in not only petroleum but natural gas and natural gas gasoline.

Hydro-power contributes its appropriate share of the total energy demand and accordingly is added to the quantity supplied by the fuels, and so becomes a factor in the statement and solution of the problem.

In order to compare and interpret the significance of the consumption of the different fuels, a common unit of measurement is required. Not all can be expressed in tons or barrels or volume, and recourse was accordingly had to the energy derivable, which has been determined according to efficiency of use of the respective fuels, both with relation to time and according to character of use. No record has been found of any previous attempt to forecast energy demand of the United States based on "effective" energy utilized and derived from the fuel consumed, and other sources.

Energy Demand

In as much as energy demand is independent of any one of the fuels, it is likewise independent of the supplies or cost of any single fuel just so long as there is abundant and widely distributed supply of one or more of them. This principle permits a study of total energy demand based on statistical data relating to the sources of supply in the years already past: and from these data forecast of future demand may be made, for the energy graph shows a consistent relation to the statistics of population. The curve of total energy demand (Figure 1) fulfills the aforesaid condition, and accordingly is given the name of "master curve."

The meaning of this is made plain by pointing out that the sum, in any year, of energy demand from coal, petroleum, natural gas, natural gas-gasoline and hydro-power invariably equals the total energy demand for that year. This statement omits consideration of cord wood, peat, windmill and animal power, because of lack of statistics, but the omissions are believed to affect the results only to a small degree and are known not to invalidate the deductions and forecast. Energy derived from petroleum coke has been included with petroleum.

Thermal energy is measured by deducting the energy wasted from the total energy contained in teh fuel as expressed in British thermal units. The term "thermal efficiency" is used to express the percentage factor by which total energy has been converted to effective energy. Thermal efficiency of all fuels in 1930 was found to vary from 5 to 80 per cent, according to the different fuels and the different purposes and methods of use. Computed weighted averages for the same year vary from 20 to 45 per cent, according to the different fuels; the minimum weighted average of thermal efficiency was estimated to be 12 per cent in the year 1840.

*Before A.I.M.E., New York, February, 1933.

TABLE 1—DERIVATION OF ENERGY IN THE UNITED STATES

Sources—	Allocation of total energy derived, % 1900	1930	Forecast 1950
Coal—bituminous and anthracite	91.3	60.3	46.6
Petroleum and its products, including also natural gas and natural-gas gasoline	4.3	31.6	45.3
Hydro-power	4.4	8.1	8.1
Total	100.0	100.0	100.0

The determination of thermal efficiency and its effect on the trend of energy demand proved to be one of the most obscure problems in this study, and it is believed the estimates of trend have been sufficiently established to impart validity to the subsequent forecasts.

Statistics of production of the different classes of mineral fuel were reduced to quantities consumed by making allowance for exports and imports and for stocks at the beginning and end of each year. Exports were not included because they did not, of course, provide energy in the United States. The quantity of exports nevertheless adds to the market for fuels produced in the United States, and the study of the export market and the determination of its trend is another story which is not attempted here.

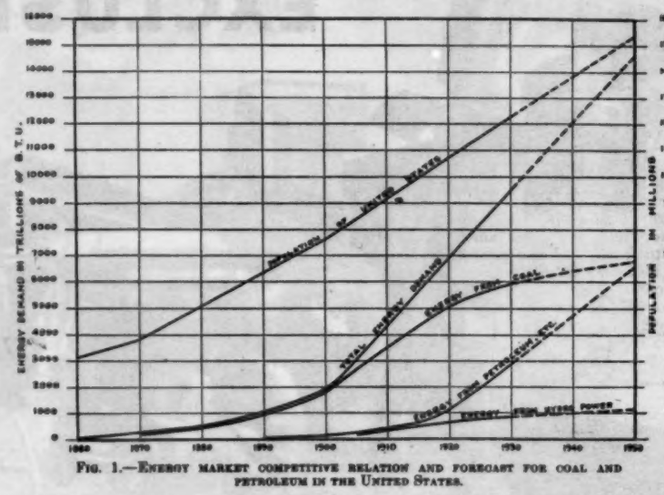


FIG. 1.—ENERGY MARKET COMPETITIVE RELATION AND FORECAST FOR COAL AND PETROLEUM IN THE UNITED STATES.

Results Summarized

The results of the statistical studies and the tabulation are shown in Table 2, summarized and reduced to the simplest terms. Figures of mineral fuels consumed in the United States are all actual, each being derived from statistical records of the year; the only exception is for 1950, which is a forecast derived from data developed in Table 3, by reversing the process of computation, and making provision for forecast improvements of practices and efficiencies in the use of the respective fuels.

The figures in Table 3 show the totals for the different mineral fuels expressed in terms of effective energy. Statistical data relating to horsepower of developed water power have been converted to effective B.t.u. equivalent by means of computing corresponding quantity of coal required in agreement with the conditions for the year under review and multiplying by the appropriate efficiency factor. The two lower lines show the population of the United States at the dates chosen, and the per capita demand for energy expressed in millions of British thermal units.

Figure 1 was drawn from the data shown in Table 3 as far as 1930. The forecasts are derived by computations according to appropriate exponential rates of annual increase, and the results so determined were plotted as shown by projection of the lines of population and total energy demand. Both of these quantities show consistent growth for the past 30 years without change of trend. Energy from coal, energy from petroleum and energy from hydro-power must, in the nature of the premises upon which the chart is constructed, be equal to the ordinate of the master curve which expresses total energy demand. The validity of the forecasts is revealed graphically by the chart.

Effective Energy Factors

In respect now to Table 2, the quantities of coal and petroleum forecast are determined according to the effective energy factors appropriate to the circumstances, and the figures in the right-hand column are expressive of the demand for these fuels in 1950. It will be observed that forecast for hydro-power has not been made. The equivalents in British thermal units instead of water power have served their purposes in preparing the chart and making the other forecasts, and no attempt is made here to reverse the process and predict hydro-power supply.

Future of Energy Demand Per Capita of Population

Table 3, in the last line, gives the total energy demand per capita and shows a consistent and steady growth, but when the demand for coal and the other min-

Report of the Underwriters Laboratories Approves Wiggins Floating Roofs

The Underwriters Laboratories have approved Wiggins Floating Roofs and have now listed them as inspected equipment of fire underwrittrs. A complete tabulation of the laboratories' findings are given in its "Report on Floating Roof for Vertical Steel Storage Tanks" dated December 15, 1932, and just issued in printed form. The underwriters' investigation covers a period of about eight years.

In its introduction, the report describes generally the function of floating roofs by stating that "one of several methods that have been devised to reduce the losses attending the aboveground storage in steel tanks of crude oil and some of its refined products involves the use of a floating roof. This type of roof rests on the liquid in the tank and moves up or down as the level of the oil rises or lowers during filling and emptying operations. It provides a constant blanket on the surface of the liquid, thus diminishing the area exposed to evaporation and preventing the formation of a large volume of vapor and air mixture within the tank."

While the report gives interesting details in the description of the device, the plan of investigation and examination and test record, the meat of the report is contained in the conclusions which read as follows:

Practicability

"The floating roof composed of the materials, and designed and installed in the manner described, is practical to use on vertical steel tanks storing petroleum products.

"It was found that installation presents no insurmountable difficulties for experienced erection crews. A study of design and of the table and curve showing various characteristics of the roof, such as weight, buoyancy, etc., leaves no doubt with respect to the degree of stability of this design.

Durability

"The materials employed and construction of this roof are such as to enable it to withstand for an extended period the effects of ordinary and severe usage as well as the deteriorating influences of corrosion due to exposure to the elements and to contact with the liquids handled.

Strength

"The design and construction of this roof are such as to impart adequate strength to parts which are subject to ordinary and severe stresses in service.

"In the 'comparison with conventional practice' were recorded several features which have been used successfully in roof construction for many years. The construction of this roof compares favorably with these practices.

"A consideration of the 'wind bracing' took into account the satisfactory experience which has been obtained with several hundreds of tanks stiffened in this manner.

"A study of the resistance offered to the stresses incident to ordinary use showed that the manufacturer has given careful consideration to the question of strength and rigidity of the assembly. The record in service extending over a period of more than 10 years testifies as to the

(Continued on Next Page)

eral fuels is examined on a per capita basis, we find a very different story.

The figures in Table 4 show a progressive and increasing rate in the consumption of bituminous and anthracite coal from 1850 to 1910. Actually, if the years intervening between 1910 and 1930 are examined, the per capita consumption of coal ran up to 6.08 tons in 1917, which was the maximum. From then on, the decline in per capita consumption of coal was rapid. It reached 4.88 tons in 1929, and 4.21 tons in 1930. The forecast for 1950 is 4.16 tons; this might seem inconsistent unless it be remembered that the year 1930 was a year of depression when the industries took less than the normal quantity of coal.

Data show the rapid rise of petroleum and related mineral fuels as sources of energy. These fuels have not only discovered new markets, particularly in the field of automotive transportation, but have made, and are making, incursions into fields for many years hitherto occupied exclusively by coal. The high point of production of petroleum lies in the future.

Conclusion

The demand for energy, irrespective of its source, increases steadily at an exponential rate considerably greater than the rate of growth of the population as, for example, the decade 1920 to 1930; the exponential rate of growth of population was 1.5 per cent annually, whereas the rate found in respect to energy demand was 3.5 per cent between 1920 and 1925; 3 per cent between 1925 and 1930. Such analysis of the growth factors indicate that at some time, a good many years in the future, the demand of the people for energy will become satisfied in the industrial areas, and from then on its increase may be only in proportion to the increase in population.

If, on the other hand, comparison is made of the exponential rates of energy derived respectively from coal and petroleum, the former is growing at a much slower rate than the population; whereas petroleum during the five-year period 1925 to 1930 progressed at an annual exponential rate of 7 per cent.

If we accept the estimates of petroleum reserves expected to be available at low cost for 20 years, the outlook for the coal industry is one of little or no growth; whereas petroleum is expected to double its market during the same period. The magnitude of the competing groups, coal and oil, eclipses all other mineral and metal industries, whether they be measured in terms of tonnage or dollars. The petroleum group occupies a favored position so long as reserves of oil continue to be ample.

Emphasis on method of interpretation has been the prime idea in the preparation of this paper, but it is none the less realized that the forecasts open the door to economic and social problems of the first magnitude.

TABLE 2—CONSUMPTION OF MINERAL FUELS IN THE UNITED STATES

Fuels—	Years 1850	1870	1890	1910	1930	Forecast 1950
Bituminous coal[1]	2,880	17,719	110,785	407,257	449,094	444,000
Athracite coal[1]	4,128	15,528	45,597	81,110	67,925	55,500
Petroleum[2]	(*)	2,553	30,874	160,000	868,484	1,419,000
Natural gas[3]	(*)	(*)	(*)	509,155	1,940,000	3,800,000
Natural-gas gasoline[2]	(*)	(*)	(*)	100	51,762	126,000
Hydro-power[4]	622	1,205	1,555	4,650	13,808	

[1]Thousands of tons of 2,000 pounds. [2]Thousands of barrels. [3]Millions of cubic feet. [4]Thousands of horsepower plant capacity. *None.

TABLE 3—SOURCES OF ENERGY IN THE UNITED STATES

	Years 1850	1870	1890	1910	1930	Forecast 1950
	Effective Energy Supply in Trillions of British Thermal Units					
Coal	32	173	955	3,620	5,443	6,760
Petroleum	(*)	3	41	405	2,857	6,570
Hydro-power	15	32	53	316	731	1,170
Total	47	208	1,049	4,341	9,031	14,500
	Population and Energy					
Population (millions)	23.2	38.6	62.9	92.0	122.8	154.
Energy per capita (millions of B.t.u.)	2.	5.	16.	47.	73.	94.

*None.

TABLE 4—CONSUMPTION OF FUELS

Fuels—	Years 1850	1870	1890	1910	1930	Forecast 1950
Coal, tons of 2,000 lbs., per capita	0.30	0 86	2.49	5 31	4.21	4 16
Petroleum, bbls., per capita	(*)	0.07	0 49	1 74	7.07	12 47
Natural gas, M. cu. ft., per capita	(*)	(*)	(*)	5.53	15.80	31.17
Natural-gas gasoline, bbl. per capita	(*)	(*)	(*)	0.001	0.42	1.06

*None.

Report of Underwriters Approves Floating Roofs

(Continued from Preceding Page)

accuracy of his judgment in employing this design.

Fire Retardant Features

"The floating roof will not permit the contents of the tank to support a continuous fire starting on the top. Its operation is not likely to start a fire. In minimizing evaporation this roof concurrently reduces the fire hazard attending the aboveground storage of petroleum products.

"The first of these conclusions is based on the results of fire tests and on the record of fires in service. Of the hundreds of roofs of this type in use it was difficult to find many on which fires have occurred. Even where records of fires were available the reports showed that only small property damage was sustained as the fires were readily controlled and easily extinguished. The design of the roof is such that an incipient fire can be readily and easily extinguished as shown by the record of fires in service.

"A study of the design showed that the possibility of sparks being struck by moving parts is remote, and that metallic contact between the roof and the shell removes the danger from the generation of static charges.

"By blanketing the entire surface of the liquid only small space is left into which the liquid may evaporate. The rate of evaporation and escape of vapors are such that concentration of vapors within the open top above the roof may be considered a negligible factor in the safe use of the roof. As the roof moves up or down with the rise and fall of the surface of the liquid, there is no discharge of vapors, except from the seal, accompanying changes in atmospheric temperatures.

Conformity

"Floating roofs of this type can be installed on general storage tanks covered by the regulations of the National Board of Fire Underwriters for the installation of containers for storing and handling flammable liquids (Class E). The material in these roofs exceeds the minimum requirements for thickness of metal in tops (Section 38a) for tanks of this class."

World's Proven Oil Reserves Are Far From Impressive Compared to Other Products

By VALENTIN R. GARFIAS
Foreign Oil Department, Henry L. Doherty & Co.*

It has been repeatedly questioned whether estimates of oil reserves are of any practical value as the greater number of such calculations previously made have subsequently proven to be grossly inaccurate. But even admitting partial justification for such statements, it must be evident that some idea, however approximate, of the available reserves of essential minerals is of vital importance in mapping their development and the future trend of the related industries. Particularly if it is kept constantly in mind that these estimates—which are never intended as a final word—must be continually subject to revision in accordance with the changes in their component factors. The value of these estimates, therefore, hinges on the clear understanding that they can only apply within the limited time when the controlling factors remain unchanged.

It should be understood, however, that while estimates of possible and probable oil deposits are as a rule but idle conjectures, appraisals of proven oil reserves can undoubtedly be made with an ever increasing degree of accuracy. And it is with this in mind that in the present study the endeavor has been to estimate only the world's proven oil reserves—the oil that yet remains underground in the producing fields—and their logical extension, and to leave out of consideration the questionable volume of the probable and possible oil reserves.

*Presented before New York meeting A.I.M.E.

ESTIMATED PROVEN OIL RESERVES
(In millions of barrels)

	Proven reserves	Total production to Dec. 31, 1932	Production in 1932	Years of past production
United States	12,000	14,787	784	74
Russia	3,000	2,883	154	72
Iraq	2,500	5	1	5
Persia	2,200	482	45	20
Venezuela	2,000	761	121	16
Dutch East Indies	1,000	547	38	40
Rumania	500	472	48	76
Colombia	400	121	17	11
Mexico	300	1,665	32	32
India	100	224	8 2	44
Peru	100	141	10	37
Argentina	100	95	13	25
Trinidad	90	84	10	24
Poland	50	231	4	59
Japan	40	65	2	58
Sarawak	30	52	2 3	20
Canada	10	33	1	71
Egypt	10	25	1.7	22
Germany	10	25	1.8	53
Ecuador	10	7	1.7	16
France	5	7	.5	15
Others	10	5	.8	
Total	24,465	22,717	1,297	

In the accompanying table the countries at present producing oil in commercial quantities are listed in the order of the magnitude of their proven reserves.

Reserves and Past Production

As shown in the table, the world's proven oil reserves are estimated at over 24,000,000,000 bbls., while the total production to the end of 1932 aggregates nearly 23,000,000,000 bbls. Past production represents, therefore, 48 per cent and proven reserves, approximately 52 per cent of the total. About 61 per cent of the reserves are located in the American continent and close to 33 per cent in the Near East fields of Russia, Iraq and Persia.

It is interesting to note that the proven reserves in the important producing regions almost equal if not exceed their production to date. The Mexican fields are a remarkable exception in this respect since they have produced over 1,500,000,000 bbls. and have proven reserves estimated at only 300,000,000 bbls.

The United States with proven reserves estimated at 12,000,000,000 bbls., or 48 per cent of the world's total, and with 65 per cent of past production, easily outranks other countries. But these reserves, important as they are, when compared to the probable future consumption in the United States, are far from impressive. In fact, our proven reserves will prove inadequate to meet demands for more than a few years unless there should be a pronounced falling off in demand.

On the contrary, the very limited oil consumption in Persia, Venezuela, Rumania, Colombia and Iraq will necessitate the marketing outside these countries of the bulk of their reserves which aggregate 7,600,000,000 bbls. As a result, and although the Persian and Colombian fields are now practically under unit control, and their output may be to some extent regulated in line with demands, those in Venezuela, Iraq and Rumania will continue to be, in varying degrees potential sources of instability in the world's oil trade.

Russia, the second ranking country with 3,000,000,000 bbls. of reserves and a past production of nearly equal amount, representing about 12 per cent of the respective totals, has been of late a disturbing factor to the oil industry. This country which now markets petroleum products with little regard to the relations between cost and selling price should increase domestic demand, as internal stabilization is accomplished, and thereby appreciably reduce its exportable surplus.

Iraq an Important Factor

One of the most important and as yet little known regions as regards future production is Iraq, the proven reserves of which have been tentatively estimated at 2,500,000,000 bbls. The Iraq fields in which various governments are indirectly interested, may play a very vital part in the industry with the termination of the pipe lines from the fields to the Mediterranean late in 1934 or early in 1935.

In a general way, according to the information now available, it may also be stated that the world's proven oil reserves are far from impressive when compared to the magnitude of the reserves of other essential products and to the probable future trend of consumption. The estimated proven reserves are equivalent to 20 odd years at the present rate of consumption but as all the reserves can not be produced within that time, it is obvious that additional supplies will have to be discovered in the next few years to assure a more permanent supply in line with consumption.

Union Wire Rope Appoints Cutlip as Representative

The Union Wire Rope Corp., Tulsa, has appointed Herbert R. Cutlip its Texas representative for Union wire lines. His headquarters will be in Dallas.

Mr. Cutlip is widely known in the oil

HERBERT R. CUTLIP

industry, having had many years' experience in the oil field equipment business. He was formerly with Fenwick-Reddaway of Newark, N. J., and with Crotty & Co., cable tool manufacturers.

Late Fields

KANSAS

Carter Oil Co. and Frank Hollow's No. 1 Schmidt, SW cor. SE NW Section 17-22-3w, a wildcat more than a mile north of the Hollow Pool, in Harvey County, was estimated to be making 24,000,000 feet of gas a day and spraying oil from the chat at 3,150-3,221 feet. It was drilling deeper at 3,233 feet on the last report with no increase in the oil and it is believed that the well will be drilled to the Hunton lime.

Derby Oil Co.'s No. 1 Schmidt, SE cor. SW NW Section 18-22-3w, is a new location in Harvey County. It is the direct west offset to the Frank Hollow and Carter Oil Co.'s No. 1 Schmidt, which found about 24,000,000 feet of gas in the top of the chat and is drilling deeper. It will be drilled with rotary tools.

The Rose Spring Oil Co. and others' No. 2 Ediger, NE cor. SE SW Section 16-21-3w, is a location in the Voshell Pool, in McPherson County, and is an offset to a 600-bbl. well.

The Globe Oil & Refining Co. expects to start running crude oil from the Johnson Pool, in McPherson County, by the end of the week. This crude oil will go into storage at the refinery at McPherson. The same company is also building a 4-inch pipe line to the Mabee Pool, in south McPherson County.

J. H. Reid and others' No. 1 Keefer, on Block 1 of the Canton townsite in Section 21-19-1w, on the east edge of the Rits-Canton-Decker Pool, in McPherson County, was rigging up to drill deeper. It found gas in the chat formation and will be drilled to the Viola lime.

The Stanolind Oil & Gas Co.'s No. 4 Zorger, SW cor. NW SE Section 21-21-3w, in the Voshell Pool, McPherson County, was shot with 10 quarts in sand at 3,380-3,400 feet and was cleaning out. Before the shot it was estimated to be a 400-bbl. well.

In the Mabee Pool, in McPherson County, Lario Oil & Gas Co.'s No. 1 Krehbiel, NW cor. SW Section 34-21-3w, swabbed 500 bbls. in six hours from the Hunton lime at 3,474-76 feet. The well will be drilled after a pipe line connection is secured. J. E. Mabee, Inc.'s No. 2 Klassen, NE cor. SE Section 33-21-3w, swabbed 186 bbls. of oil in two hours from the Hunton lime at 3,454-73 feet. It is the west offset to the Lario Oil & Gas Co.'s No. 1 Krehbiel.

OKLAHOMA

The Oklahoma Corporation Commission issued an order Monday, February 20, signed by Commissioners Jack Walton and E. R. Hughes, to start taking potential tests in the Oklahoma City Field at once, using members of the conservation department, under the direction of W. J. Armstrong, chief conservation agent.

The taking of the new potentials is expected to start by Thursday, February 23, when Armstrong said he would have rules and regulations ready. Potential tests were scheduled previously to start on February 15, but this was cancelled by the Corporation Commission after a letter from Governor Murray requested the commission to delay the tests because the militia would decline to aid in the work.

J. B. Nichols and others' No. 1 Rigney, SE cor. NW, Section 12-5-9w, in the Cement Field of Caddo County, bridged after a shot. It was showing oil and gas from a sand at 4,311-31 feet. The well was cleaning out and tubing will be run to test the production from this sand.

Denver Producing & Refining Co.'s No. 1 Noe, NW cor. SW, Section 34-10-10w, a wildcat in northern Caddo County, was drilling below 5,100 feet on the last reports. It is expected to be drilled to the Wilcox sand.

Location has been made for H. Sturm and others' No. 1 Burroughs, SE cor. SW NW, Section 10-11-3w, in Block 5 of the Eggleston addition, of the Oklahoma City Field.

The Oklahoma City Field was given an additional oil outlet Monday, February 20. H. F. Wilcox Oil & Gas Co.'s nomination of 15,000 bbls. a day for the month of February was allowed. Sunray Oil Corp.'s nomination of 6,600 bbls. daily was allowed for the remainder of the month, all from the Wilcox sand zone. Wirt Franklin Petroleum Corp. was granted 2,500 bbls. daily and the Sinclair Prairie Oil Marketing Co.'s nomination of 8,000 bbls. daily, both from the Simpson sand zones, was approved.

The total allowable nominations in the Oklahoma City Field are now 154,694 bbls. These nominations increase the allowable in the Wilcox sand zone to 2.8 per cent of the potential and to 5 per cent in the Simpson sand zone. This is the highest nomination the Oklahoma City Field has had since December, 1931.

Watchorn Oil & Gas Co.'s No. 1 Zoller, NW cor. SE, Section 5-6-5, in the southeast edge of the Sacred Heart area of Pottawatomie County, swabbed 137 bbls. of oil in three hours from the Simpson dense at 4,087-4,114 feet.

ORDER SALE OF REFINERY

FORT WORTH, Tex., Feb. 21.—Public sale of Cosden Oil Co. properties will be held at Big Spring, Tex., on March 28 as a step in the dissolution of receivership into which company was placed November 10, 1930. J. S. Cosden, former head of the company, is actively identified with the movement to dissolve the receivership and is expected to resume management after the sale. The concern has remained active under G. N. Moore and Henry Zweifel, receivers. The company has a complete refining unit at Big Spring and production in Howard and Ector Counties.

PAUL L. BROOKS PROMOTED

FORT WORTH, Tex., Feb. 21.—Paul L. Brooks has been promoted to salesmanager of the Parkersburg Rig & Reel Co. and has moved from Dallas to Parkersburg, W. Va.

East Texas Crude Production and Shipments

Believing that the crude oil and gasoline price structures bear a direct relation to effective enforcement of proration regulations as crude oil production in excess of allowables results in sales of the raw material under regularly posted prices and cut prices for gasoline made from this crude, The Oil and Gas Journal will present each week the best figures available on the situation in East Texas. There is presented below a recapitulation of figures procured by The Oil and Gas Journal for the week ending February 13 and, under that, a report of the Texas Railroad Commission for the week ending February 11.

Crude Shipments

	Bbls.
Main pipe lines	310,040
Local refineries	37,758
Tank cars	30,866
Total reported shipments	378,664
Reported production	300,200
Shipments over production	*78,464

*This has generally been charged to withdrawals from storage but excess shipments have been going on for many months while storage has remained virtually constant.

Texas Railroad Commission's Report

Weekly recapitulation of daily reports of East Texas crude oil movements from East Texas Field, February 5 to February 11, inclusive:

(Actual barrels checked, average 7-day period)	
Pipe lines	284,063
Tank cars	31,176
Total actual barrels checked	315,239
(Estimated barrels, average for 7-day period)	
Pipe lines	30,000
Refineries	18,214
Total estimated barrels	48,214
Total actual and estimated barrels	363,453
(Deliveries and storage, average 7-day period)	
Pipe line main line storage decrease	20,513
Total deliveries per day less storage decrease	342,940
Reported production per day	300,497
Excess shipments	42,443

Captain Flanagan Guest of Honor in Colombia

NEW YORK, Feb. 20.—Capt. J. W. Flanagan, president of Andian National Corp., and outstanding pipe line builder, was guest of honor at a dinner given recently at Cartagena, Colombia, by the

CAPT. J. W. FLANAGAN

Chamber of Commerce of that city, and attended by oil leaders in that country, as well as dignitaries of the church, state and army. On his arrival at Cartagena, Captain Flanagan was welcomed by a committee representing the chamber of commerce.

Captain Flanagan arranged for the pipe line concession from the Colombian government in 1923, after he had been in Colombia for three years completing the necessary preliminary work. He was actively in charge during the 11 months in which construction of the original pipe line was carried out and again took charge in 1927, when the line was looped to provide additional carrying capacity. He was made president of Andian National Corp., which is a subsidiary of Imperial Oil, Ltd. (Standard Oil Co. [New Jersey]) in 1925.

W. W. RICHARDSON DIES

WICHITA FALLS, Tex., Feb. 20.—W. W. Richardson, 47, an oil operator, was found dead here Wednesday night. He was born in Boston, Mass., and came to Oklahoma in 1912, working for 15 years with the Cosden and Independent companies with Tulsa as his headquarters. With the Independent, he was field superintendent.

A.P.I. EXECUTIVE COMMITTEE

The next meeting of the executive committee of the American Petroleum Institute will be held in Institute headquarters, New York, Tuesday, March 14, at 9:30 a.m. This will be the regular monthly meeting. The Institute's board of directors is scheduled to meet next on Wednesday, May 17, in connection with the Institute's midyear meeting at Tulsa.

FIGHT CHAIN STORE TAX

Indiana oil companies under the leadership of the Indiana Petroleum Marketers Association are beginning an active fight on the chain store tax increase bill, which has passed the state house of representatives and is now before the finance committee of the senate. Under the bill, the tax per unit of stores is heavily increased. The proposed increases are much greater in cases of large chains, in some cases the increase being 600 per cent. The State's present law calls for a tax of $3 for one store, which would be boosted to $5 under the new law; whereas the tax of $25 per unit in a chain of more than 20 stores would be increased to $150 per unit. According to the Petroleum Marketers Association, the Indiana taxing authorities consider filling stations taxable under the chain store act.

Present Tendency in the Development of New Methods in the Production of Crude Oil

By RAYMOND M. CARR
Sinclair Prairie Oil Co.*

About 10 years ago the rotary method of drilling appeared in Mid-Continent fields and within a few years wells were being drilled to producing horizons that previously had been considered only as speculative possibilities. The oil producer was suddenly confronted with the fact that drilling methods had outstripped producing methods. Orthodox production methods which had served the producer since the inception of the industry and which, doubtless, will continue to serve him for many years to come in the shallower fields, had in the beginning the extreme advantage of simplicity. For shallow fields, the sucker rod, jack, shackle line and power solves the problem conveniently and economically. If an engineer should attempt to calculate the overall efficiency of an early installation of this type, the results could scarcely be expressed without resorting to the use of negative figures, but from the viewpoint of a production man, the outfit gets the job done day after day, and after all, that is the yardstick by which its true efficiency must be judged.

Faced by the necessity of lifting oil from deeper and deeper wells, producers and manufacturers alike began developing equipment capable of performing the task. For the most part, the trend of development followed the lines of lease resistance and consisted of heavier prime movers, larger rig fronts, improved sucker rods and the like. By the time Seminole was discovered the typical beam pumping installation had become a fairly complex plant, equipped with a gas engine, air starter, countershaft, counterbalance and as many accessories in the form of rod hangers, beam hangers and patented stuffing boxes, as the individual experience or fancy of that particular operator might prefer. Here and there, however, efforts were seen of a tendency to leave the beaten trail and several innovations have appeared in producing methods during the past four or five years. Some of these are new in principle, others are merely adaptation of old principles. It is the purpose of this paper to briefly review some of these methods and devices and by so grouping them, to point out the trend along which future production practices appear likely to develop. We do not propose to discuss mechanical or constructional details except where necessary for clearness.

The following classification, Figure 1, has been made in order to facilitate discussion and to give a full perspective view of the producing methods which are available to the industry at this time. They are arranged in the same sequence in which they are usually employed.

Natural Flow Methods

Open Flow—In the past, a great majority of our wells, in the flush stages of their lives, were produced by open flow. It was only a coincidence if this method utilized the maximum energy of the gas. As the functions of natural gas in a reservoir were more fully understood, however, and its true value became apparent, operators reversed their early conceptions that gas was more or less of an evil by-product. Today, we find a conviction that oil recovery is in reality the by-product of gas energy. This reversal of ideas has lead to the adoption of restricted flow as a means of obtaining better energy control and increased ultimate yield.

Restricted Flow—Tubing and top hole chokes have, until recently, been the most usual methods of restricting flow. Early in the industry it was discovered that when wells ceased to flow through casing it was possible to prolong natural flow by running tubing. Strictly speaking, this amounted to a velocity control rather than a back pressure control, because the object was to confine the uprising gas into a small flow string so that its velocity would be great enough to prevent slippage. As a general practice, tubing was not run until the reservoir pressure was greatly depleted. Any

CLASSIFICATION OF PRODUCING METHODS

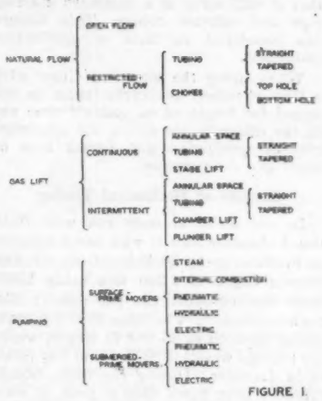


FIGURE 1.

improvement in gas-oil ratios passed unnoticed in the majority of cases, as the primary consideration was to keep the well flowing.

Top hole chokes have, of course, been in use since the first wells were equipped for flowing. Any surface valve, bean or other device used for restricting free flow of fluid from a well can be classed as a top hole choke. Formerly these were employed solely for controlling the rate of production, as a brake may be used in slowing down an automobile. Gradually it was learned that in some wells a material decrease in gas-oil ratios could be obtained by restricted flow. The use of tubing and top hole chokes for regulating gas-oil ratios is now quite common. In a few fields, notably East Texas, the use of tubing has become mandatory for the dual purpose of restricting flow and conserving gas.

The theory underlying restricted flow or back pressure control has been well stated by Miller[1] who says:

"Oil and gas flow through the irregular channels in reservoir sands at different rates mainly because of the fact that one is a liquid and the other a gas. Therefore, because oil and gas have different characteristics of flow, application of back pressure changes the rates of flow with relation to one another so that wide variations in gas-oil ratios are possible."

Use of Tapered Tubing

When gas volumes become small and pressures low, wells can frequently be continued on natural flow by adopting tapered or graduated tubing. One of the clearest expositions of the theory of tapered tubing, either for natural flow or gas lift, has been given by Pierce and Lewis[2] who say:

"The use of tubing tapered downward is based upon the fact that as the gas approaches the top of the well the pressure becomes less; the gas expands and flows with increasing rapidity, thus greatly increasing the velocity. . . . In deep wells this velocity accelerates so much that the friction becomes enormous. At the bottom of the well the upward flow of the oil and gas is relatively slow, and probably much too slow for efficiency, considered from the standpoint of slippage. On the other hand, near the top of the well the flow is much too fast, considered from the standpoint of friction; therefore, the need is for a design which in effect will increase velocity at the bottom of a well and decrease velocity towards the top."

In Figure 2, we have a diagrammatic sketch of a well equipped with tapered tubing. The changes in size must be worked out with due regard to the space occupied by the increasing volume of gas as the pressure varies upon it. Combinations which will give satisfactory results in one well will not necessarily give results in another well even on the same lease. Volume, pressure and height of lift must all be taken into consideration, as well as the interrelation between pipe diameter and velocity, before a proper combination can be chosen. Experiments by Hawkins[3] and others indicate that a well may be flowed on a remarkably small amount of formation gas if the pressure in pounds is equivalent to 5 per cent of the depth expressed in feet.

The use of tapered tubing has been principally to obtain better velocity control within the flow string itself. So far little or nothing has been published bearing on tapered tubing as a means of backpressuring the reservoir.

When top hole chokes are used gas energy is wasted because the gas is not fully expanded until it passed through the choke. Bottom hole chokes are designed to permit the same back pressure control on the reservoir as with top hole chokes and also to utilize the energy of the expanding gas to lift oil to the surface. Bottom hole chokes have been classified as follows[4]:

(a) Fixed.
(b) Adjustable.
(c) Replaceable.

Fixed chokes can be changed only by pulling the tubing (the flow string); adjustable chokes can be changed in size by manipulation of the tubing, while replaceable chokes are changed by pulling and running them on a sand line or Halliburton line. In Figure 3, is shown a type of fixed choke. Oil and entrained gas are admitted through an opening at the bottom. If the occluded and dissolved gas is insufficient to supply the necessary lifting energy, some extraneous or free gas from the casing space is admitted through side ports.

Natural flowing methods have been greatly augmented by the use of tubing and chokes. When used merely to control rate of flow it is not discernible that any far reaching results will be derived but when used primarily as a means of reducing energy ratios their use will doubtless result in much longer natural flow and increased ultimate yield. Back pressure control by means of small flow strings and bottom hole chokes appears to be only in its infancy. Tapered tubing occupies a particular field of its own as a final corrective measure when pressures are low and volumes of gas are small. The combination of bottom hole choke and tapered tubing holds forth many enticing possibilities which have as yet no experimental evidence to uphold them.

Gas Lift Methods

Turning now to gas lift, or air lift, we find it convenient to divide the practice into two general groups: (a) Continuous and (b) intermittent. The continuous lift has been used at various times since the first oil wells were drilled. According to Miller,[5] air lift, or the air

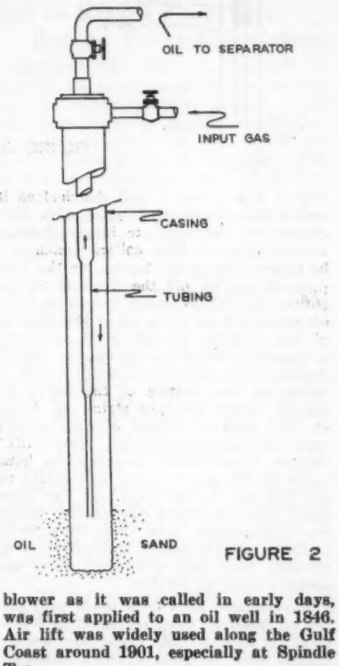


FIGURE 2

blower as it was called in early days, was first applied to an oil well in 1846. Air lift was widely used along the Gulf Coast around 1901, especially at Spindle Top.

Not until the Seminole development did gas lift meet with wide favor in the Mid-Continent. This was not its first application but it was by far the most general. One wonders why it was not retained as a substitute for pumping. The explanation probably lies in several directions. In the first place continuous lift necessarily requires a certain amount of back pressure against the sand reservoir. After fluid levels fell to 250 or 300 feet, sufficient difference in pressure between reservoir and well bore could not be maintained to permit maximum flow of oil from reservoir to well. In the second place, the only objective in view at Seminole was maximum daily rate of production and little research was done to adapt gas lift to small wells. In the last place, production men were reluctant to abandon conventional pumping methods because all their experience, all their equipment—in fact their entire producing organization has been built around pumping methods.

After the first flurry of application died down and competitive requirements

*Before A.P.I. Mid-Continent district meeting, Wichita, Kans., February 17-18, 1933.

Note—The author's title of this paper is "Present Tendencies in Production Practice."

[1]Miller, H. C., "Back Pressure Control of Flowing Wells," Petroleum Development and Technology, 1928-29, A.I.M.E., p. 196.

[2]Pierce, H. R., and J. O. Lewis, "Principles of the Air-Gas Lift as Applied to Oil Production," Petroleum Development and Technology, 1927, A.I.M.E., p. 19.

[3]Hawkins, R. R., "Flowing Wells With Small Tubing," Petroleum Division, A.I.M.E. Houston meeting, October, 1931.

[4]Clark, William A., Petroleum Development and Technology, A.I.M.E. 1931, p. 264.

[5]Miller, H. C., "Gas Lift Methods of Flowing Oil Wells," U.S.B.M. Bulletin 333, p. 2.

were satisfied, numerous ideas and devices were brought forth to adapt gas lift to small wells or to improve its efficiency on larger ones. The first step was to flow wells through tubing rather than through the annular space between casing and tubing. Tapered tubing was tried as a successor to straight tubing and although conflicting opinions are prevalent over the merits of tapered strings, the concensus of opinion seems to be that tapered strings are more efficient.

Numerous kick-off collars, flow collars and similar devices have appeared, most of them intended to permit gas to flow into the tubing at various points. In

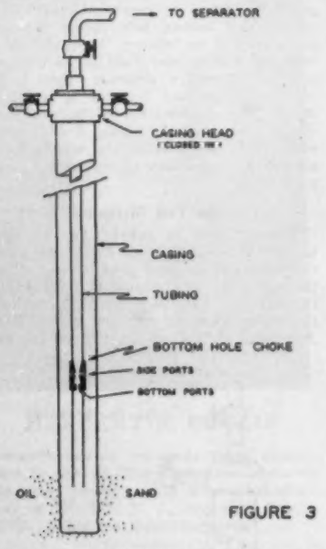


FIGURE 3

Figure 4, we have a well sketched as it would appear when equipped with flow collars. At the right are larger sketches of two types of flow collars which can be inserted along the tubing for the purpose of kicking off the head of oil by stages. At "A" is shown a type of kick-off collar which closes when the velocity of gas rushing through it is sufficient to overcome the tension on the flat spring. Another type of kick-off collar, which is closed by the velocity of the rising oil column within the flow string, is shown at "B." Kick-off collars of this general type are sometimes called "stage lift" devices. Considerable progress has been made in the use of these auxiliaries to gas lift but so far their use has been based upon empirical information. When the fundamental laws controlling their performance are better understood it is probable that they will be of more assistance than at present.

Experiments have been made with the use of "booster" holes placed at intervals along a flow string. These are merely critical flow orifices of small diameter which will pass only a fixed quantity of gas from the annular space into the tubing as long as the pressure within the flow tubing is only half, or less than half, of the pressure in the annular space.

Intermittent Lift

During the past four or five years more attention has been given to intermittent than to continuous gas lift. At the close of the Seminole development, two types of intermitters were in general use. One of these consisted of an electrical timer usually located at a central point upon the lease, connected by two wires to a magnetic valve. The timer, which is somewhat similar in principle to the distributor of an automobile, is operated by a small motor driving a rotating contactor which makes contact to a large number of distributor segments. These segments may be connected in a great variety of ways and by varying their combination as well as the speed of the motor, almost any combinations of on and off time may be made. The second intermitter which was frequently used, consisted of a cylindrical tank pivoted about its center axis. In the center of the tank is a partition. A small pipe just above this partition allows a small stream of water to flow into one end of the tank. When that end becomes filled with water it rocks downward and the partition diverts the stream of water to the opposite end of the tank. During the time the upper section is filling, the lower section is draining through a small opening so that each end of the tank alternately fills and drops, then drains and rises.

The greatest disadvantage of continuous or intermittent gas lift, when used on wells of small size or low fluid level, is back pressure created against the reservoir by flowing gas. Two schemes have been tried in recent years to eliminate or diminish the effects of the working pressure against the reservoir. The old flow chamber idea, which was originally brought forth in the early Ohio fields, was resurrected and, when combined with modern types of intermitting valves, has produced results that promise much for future production practices. The second scheme, known as the plunger lift, is a more radical departure from established practices. It is being used in several fields and is worthy of attention. These two methods will be discussed in more detail in the following paragraphs.

The chamber lift, shown in Figure 5, consists essentially of two strings of tubing run one inside the other. On the bottom of the outer tubing is an enlarged section equipped with a standing valve at the bottom. The inner string of tubing acts as a flow pipe and the annular space between it and the outer tubing is used as a gas passage. The inner tubing extends nearly to the bottom of the flow chamber, which is set as close as practicable to the bottom of a well. The length of the flow chamber and the diameters of the outer and inner tubing depend chiefly upon the daily production of the well. The maximum diameter of the flow chamber depends, of course, upon the diameter of the well casing. In operation, after a well has been equipped, high pressure gas is alternately applied to and released from the annular space

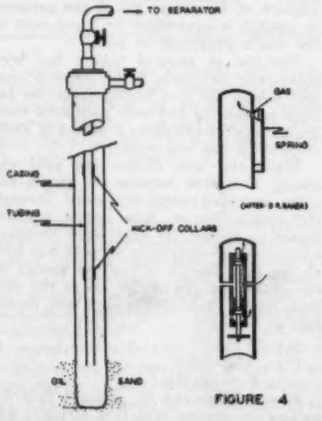


FIGURE 4

between the two tubings. When pressure is applied to the top of oil standing within the flow chamber, the standing valve in the bottom of the chamber is forced shut. As pressure is increased, the oil is displaced from the chamber into the inner string of tubing and flowed to the surface. After the slug of oil has been ejected, the high pressure gas is released from the annular space and the flow chamber will be refilled from the well. During the flowing period no pressure has been exerted against the reservoir or sand.

Fluid Level Timer

Two popular methods are available for intermitting the gas pressure into the annular space. The first of these is the electrical timing device previously mentioned. The second device, which we may call the fluid level timer, is actuated by the fluid column within the well itself. For shallow wells this type of intermitter was originally operated through a third string of small diameter tubing run into the well and operating as a "starting" pipe. In Figure 6, we have a sketch illustrating the principles used for fluid timed chamber flow. Valves "A" and "C" are closed and valve "B" is open while the well is filling. A reducing valve cuts down the line pressure and permits a small amount of low pressure gas to flow through the starting pipe. As fluid rises over the lower end of the starting pipe, more and more back pressure is created against the starting pipe. Since the pressure to force gas out the lower end of the starting pipe is equal to the submergence of the pipe, we can readily determine from the pressure shown on the gauge at "E" when the well has filled to the desired height. Valves "A" and "C" are then opened and valve "B" is closed and the well starts on a flowing cycle. Gauge "D" indicates pressure within the flow tubing. This pressure rises rapidly as the ejected fluid nears the top and indicates that valves "A" and "C" should again be closed and valve "B" opened. The automatic control which has been developed to perform the operations above described is actuated by an ingenious combination of diaphragms and valves which take care of every phase of the operation. No attention is required beyond occasional inspection and cleaning. Only a few hand tools are required and the entire assembly can be overhauled in one or two hours.

In deep wells, the starting pipe may be eliminated if so desired and the inner or flow tubing connected in such a way that it will serve as a combined starting pipe and eductor tubing. This feature has broadened its field of application materially.

When using the electrical timer with a flow chamber, the cycles must be adjusted for length of on and off time until the intervals are giving the maximum rate of production and lowest rate of input gas consumption.

Results of Mechanical Timing

In one series of tests run with fluid timed chamber flow it was found possible to produce up to 60 bbls. of oil per day from a depth of 2,340 feet using 1,500 cubic feet of input gas per day at 250 pounds pressure. The traps were 5½-inch casing from 40 to 65 feet in length, while the tubings were 1¼ inches and 2½ inches in diameter. During the tests, which extended over more than a year, it was determined that flow chamber flowing would increase production on nearly all wells. In some instances the daily production was raised 100 per cent. A group of 12 wells in the Cromwell Field operating with mechanical timing were reported[4] to have increased from an average of 118 bbls. to an average of 143 bbls. per day when placed on chamber flow.

The plunger lift operates in such a way that the working pressures necessary to lift oil are very low. Some question may be raised as to its classification as a form of gas lift, but since gas pressure is the motive power which causes it to function, it has been placed in that group, temporarily at least. In some instances a well furnishes enough formation gas to operate the plunger lift, while in other cases outside gas must be introduced.

The general plan of a well equipped for plunger lift is shown in Figure 7. The tubing is reamed to insure a truly accurate diameter and special couplings are used that align the ends of the tubing perfectly. Any offsets at the joints would interfere with the operations. The tubing is supported at the top in a casinghead which has a bonnet at the top creating an upper chamber into which fluid from the tubing is discharged. A metal plunger travels up and down in this tubing, going from top to bottom and back to the top again for each complete stroke or cycle. An enlarged view of the plunger is shown. The plunger valve is so designed that it will not close while falling through gas or fluid. At the bottom of the tubing is a footpiece through which gas and fluid enter. The top of the tubing above the casinghead has a short "stack" (which is merely a piece of the reamed tubing), also a valve, above which is a surge chamber, connected through a by-pass of flexible hose to the flow line.

[4]Sclater, K. C., "The Petroleum Engineer," September, 1930, p. 50.

Operation of Plunger

After the well is tubed and the footpiece set at the desired level, the plunger is placed in the surge chamber, which is then closed at the top. Upon opening the main valve "A," the plunger is released and falls to bottom. The plunger velocity through gas is around 40 feet per second and around 8 to 10 feet per second through fluid. When the plunger strikes the footpiece, the poppet type plunger valve is closed, thus effectually blocking the upward passage of any gas. As soon as the pressure beneath the plunger becomes great enough to overcome the weight of fluid above, the plunger starts upward, pushing the fluid ahead of it. When the plunger reaches the surface, the fluid is discharged through the slotted openings within the casinghead and the plunger overrides the slots and remains in the stack until the gas pressure beneath it diminishes enough to allow the

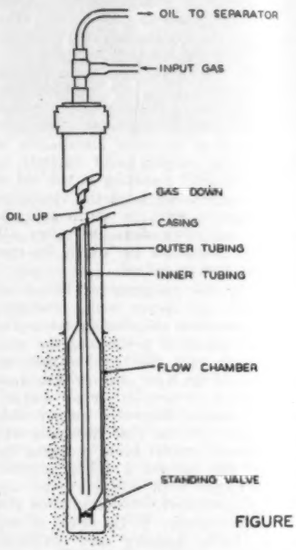


FIGURE 5

plunger valve to drop open, whereupon the plunger starts falling again. After the head is worked off the well, the plunger cycles will become regular and the quantity of oil brought up each stroke will be the same.

The plunger does not need to fit the tubing closely. A clearance of 20 to 30 thousandths of an inch (about one thirty-second) has been used. About 2 pounds of pressure is sufficient to float the plunger in the tubing and since the column of fluid above the plunger about equals the pressure of gas beneath it, there is only a slight differential to cause slippage or gas around the plunger.

The working pressure required is dependent upon the length of the column of fluid picked up on each stroke and not upon height of lift. The quantity of gas required is partly a function of the height of lift and partly of the operating pressure. A choke in the discharge line provides one means of regulating the rate of production or it may be further regulated by raising and lowering the footpiece. The plunger may be caught and examined at any time and a replacement made if necessary, but because both tubing and plunger are well lubricated, little wear takes place. Paraffin scraping plungers may be used where deposition of this material interferes with continuous operation.

Wide ranges of capacity can be had with this apparatus by using larger or smaller tubing and varying the length of head picked up each stroke. At one well, 40 bbls. of oil per day were produced by plunger lift from a depth of 6,000 feet in 2½-inch tubing, using 3,500 cubic feet of input gas per barrel at 50 pounds pressure. The plunger averaged about seven strokes per hour. On a second well, 180 bbls. per day were produced through 2½-

inch tubing from a depth of 5,600 feet, with a pressure of 175 pounds and an input ratio of 1,500 cubic feet per barrel. In this case the plunger was making a round trip every 10½ minutes and bringing up about 1½ bbls. per trip. In the former well, the plunger brought up but one-fourth barrel per stroke.

Pumping Methods

Surface Prime Movers—With one exception we shall give but brief attention to all pumping equipment which is driven by surface prime movers. Not for the reason that improvements have not been made, but because these improvements have not introduced new principles. As long as we continue to generate power at the surface and transmit it to the point of application by means of sucker rods or similar linkage, we are using much the same principles that have been followed from the beginning. This statement is not to be construed as derogatory to ordinary pumping because it was stated in the introduction that these conventional methods would probably serve the industry for years to come. Research in metallurgy, improved manufacturing methods and intelligent study of the producer's problems have enabled manufacturers to offer products for ordinary pumping which are far superior to those of a few years ago. Modern design will eliminate many flaws which have heretofore been tolerated as necessary nuisances. Moreover, the efficiency of the newer equipment is vastly superior to older types. We hold it to be a fact, however, that it is possible to increase dimensions and add weight or horsepower to this equipment only up to a certain point. Beyond that point the whole structure is due to collapse of its own weight or at least become a self-devouring mechanism which consumes the efficiency it seeks to create.

The exception which should be mentioned here is a recently introduced pneumatic cylinder, designed to reduce the amount of equipment necessary at individual wells and permit centralization of power equipment. The pneumatic cylinder is suspended from the crown block by hangars to each corner. High pressure gas or air is supplied beneath a single acting piston and special inlet and exhaust valves are regulated to take advantage of early cut off on the power stroke. The exhaust gas returns to the compressors under partial pressure. The length and number of strokes per minute are easily adjustable. Although "air heads" have been used previously, the development of this improved design offers one splendid "follow up" solution to the pumping problem when gas lift has been in prior use on the lease. Instead of moving the gas lift stations and installing ordinary beam pumping equipment the "air heads" may be connected to the existent high pressure gas system, rods and tubing run into the well and pumping started. Data on the performance of these devices has not been published but tests have been under way for many months.

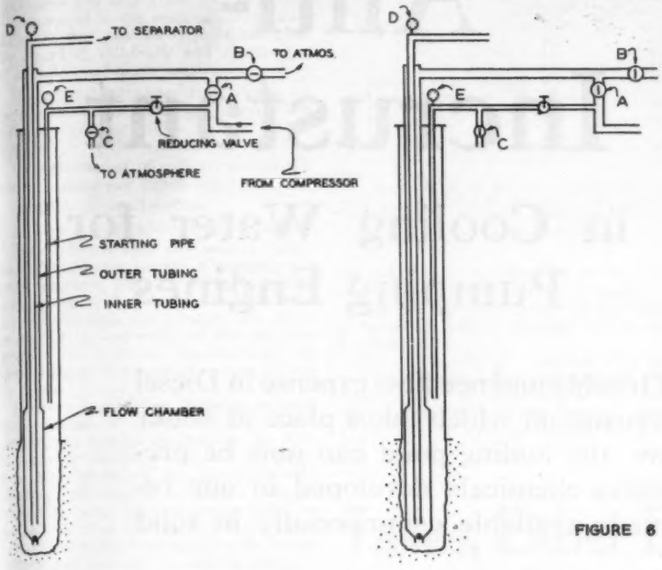


FIGURE 6

Submerged Prime Movers

The theory of a submerged prime mover has so many obvious advantages that it has also received much attention during the past few years. As shown on the outline, three choices of driving energy are available: Pneumatic, hydraulic and electric. Each of the three types has its adherents who have built and tested machines embodying their ideas. In the Mid-Continent fields the submerged electric pump has received the largest share of attention due to the active interest of at least one major producing company. This pump has passed the purely experimental stage and entered upon the period of development which must inevitably follow. Submerged pneumatic or hydraulic prime movers are yet in the embryonic or experimental stage although they are being studied with renewed interest as deeper producing horizons are discovered.

The electric type of submerged prime mover consists of an electric motor of special design located at the bottom of the assembly. Immediately above it is a protector, or stuffing box, section and at the top is a multistage centrifugal pump. The entire assembly is run into the well on tubing and electric power is transmitted through a specially insulated cable. Up flow of oil is through the tubing. Most of the experiments with this type of submerged prime movers have so far been conducted in wells having short lifts of 1,500 or 2,000 feet, but where it was necessary to produce huge volumes of fluid. Recently smaller types have been made capable of handling smaller quantities of fluid from greater depths.

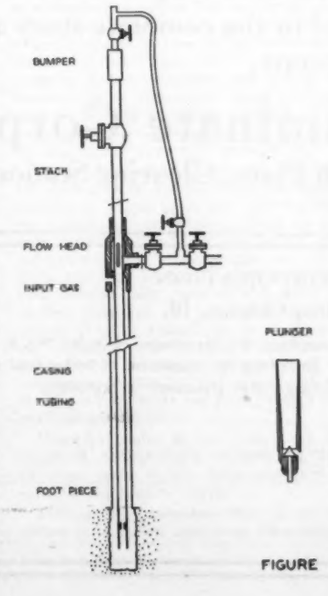


FIGURE 7

Submerged pneumatic or hydraulic prime movers are practically all of reciprocating types and require at least one and sometimes two strings of tubing for transmission of the driving power to the engine. Most designs of pneumatic engines for this purpose have attempted to use the exhaust gas or air to lighten the load of fluid which is being lifted. If a really satisfactory submerged prime mover can be developed, it will greatly increase the depth from which pumping is possible. The centrifugal pump is primarily adaptable to shorter lifts where great volume is to be handled. The plunger pump is adaptable to lifts of 7,000 or 8,000 feet, but the difficulties of actuating it by means of sucker rods increase out of all proportion to the increase in depth. It is possible to pump from 7,000 feet or more using our present equipment and operating the pumps with long slow strokes, providing the operator is content with a small daily production. Development of a really satisfactory prime mover which can be placed next to the working barrel and receive its energy from the surface in the form of compressed gas or fluid pressure would permit a higher number of strokes per minute and greater rate of production. Such a device must operate with great reliability and infrequent attention. Down time for failures would be out of proportion to failures with surface prime movers and require a tubing job for each failure—something of major consequence for a 7,000-foot well. The field for submerged prime movers is so attractive that they are bound to receive an increasing amount of attention but experimental work will be slow.

Summary

During the past five years, the depth from which oil must be produced has increased from 4,500 feet to around 6,500 feet. No major pools have yet been discovered at greater depths in Kansas and Oklahoma, but wildcat wells of 7,000 or 8,000 feet are no longer a novelty. It is entirely logical to expect that within the next five years, producers in the Mid-Continent must solve the problem of lifting oil from those depths by some means which will yield a profit to themselves. Lower market prices have forced the operator to investigate his producing methods carefully, seeking for more efficient equipment with which to produce from present depths.

In view of the unfavorable conditions which have existed throughout the past two years, it is indeed astounding to look at the progress which has been made in producing methods even during the times of economic stress. In the first place, the fast increasing realization that formation gas energy is the most important agent in the recovery of oil has led producers to strive for its conservation by all the means at their command. Open flow of wells has very largely given way to restricted methods, in which chokes or tubing are employed to back pressure the reservoir and control the ratio of incoming gas to oil. Engineering practice has developed a better knowledge of the principles underlying movement of gases and liquids through reservoir sands and through pipes. With this information, the producer can confidently expect to flow wells on their own energy for a much greater length of time and, what is more important from this point of view, secure an increased ultimate yield of oil.

Gas lift methods have been developed and tried which extend their application to very small and very deep wells. The application of chamber lift and plunger lift reduce the number of working parts in a well to only one. Small tapered or straight flow strings require no moving parts. Chamber lift can be used on wells with little or no formation pressure and when used with automatic intermitters, eliminates to a great degree the human equation. When used with fluid level timers, the well determines its own rate of pumping. Plunger lift reduces the necessary working pressure to a minimum and the pressure required is practically independent of the height of lift.

Conventional pumping equipment is getting a thorough overhauling and redesigning which will certainly extend its field of application and promises much greater efficiency than ever before. Such features as submerged prime movers are attracting a host of experimenters and manufacturers who will eventually solve the problem, at least for certain types of work.

Last but not least in the tendencies of present production practice, we see a vast difference in the technique of production men and operators. An understanding of a few fundamental laws governing the behavior of gas and fluids has given them a different conception of producing oil wells. Gas lift, tapered tubing and bottom hole chokes all have some place in the modern producer's tool kit. They have been taken from the laboratory shelves and made into useful implements in which the production man has confidence. Chamber lift, plunger lift and submerged prime movers will find their way into the tool kit in time.

Bill to Repeal Proration Before Texas Legislature

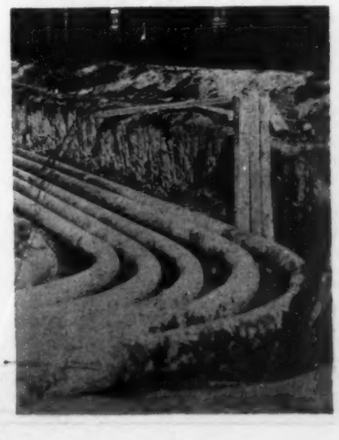
AUSTIN, Tex., Feb. 18.—A bill to repeal the Texas oil proration laws, including the recently enacted statute giving the State authority to limit production to market demand, has been introduced in the Texas House of Representatives by Representative P. L. Anderson of San Antonio.

Anderson also introduced a bill that would divorce producers, transporters and refiners of oil from the retail distribution of refined products. The bill provided that companies could be organized to store and transport, produce, drill, deal in royalties, refine petroleum and engage in wholesale under one charter, but retailers would be required to obtain a separate charter. Dual stock ownerships and interlocking directorates would be prohibited. Companies would be allowed one year to close out the affairs of their retail branches under Anderson's disintegration bill.

Divorce of gas and oil pipe line operation from the business of producing gas or oil was proposed in a bill offered in the Texas Senate by Senator Clint C. Small of Amarillo. The bill would require separate corporations for operations of pipe lines for transportation of either gas or oil.

A bill for the creation of a three-member Texas public utility commission was introduced in the house by Representative Hill of Webb.

A 90-Degree Bend in Pipe Line



Leading Oil Companies Use this Anti-Incrustant

in Cooling Water for Pumping Engines

SCALE is a source of trouble and needless expense in Diesel and oil engines. Incrustation which takes place at water temperatures below the boiling point can now be prevented by a blend of effective chemicals developed in our research department and made available commercially in solid form as Nalco No. 8.

For pumping engines, this chemical treatment is ordinarily effected in the circulating tank, while for the many accessories in power plants the chemicals are introduced in the water by small pressure feeders set in a by-pass on the line carrying the water to be treated. These feeders contain the solid balls, which dissolve slowly and from the surface only, thereby adding the ingredients to the water in uniform mixture.

Nalco No. 8 is the solution of a problem which has formerly received less attention than it deserves. A number of the big oil companies are regularly using this treatment and are demonstrating the economy which it makes possible.

You will be interested in the complete story as told in bulletin No. 28. Ask for your copy.

National Aluminate Corporation

6233 W. 66th Place, Clearing Station

CHICAGO, ILLINOIS.

—And for Boiler Water

The Anti-Incrustant described above is a new addition to this company's business. It does not interfere in any way with the service which we render to thousands of leading industrial plants and railways in connection with the treatment of boiler feed water. If you have any problem of water treatment it will pay you to investigate the

NALCO KWS SODIUM ALUMINATE SYSTEM

NATIONAL ALUMINATE CORPORATION
6233 West 66th Place, Clearing Sta., Chicago, Ill.

☐ Please send me your Bulletin No. 28 describing the advantages of Nalco No. 8, a new anti-incrustant.
☐ Please send me bulletins 9-A and 12-B describing the treatment of boiler feed water with the K.S.W. System.
☐ Please have a representative call to discuss water treatment in my plant.

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Company .....
Street .....
City ..... State .....

Economies Effected by the Chemical Treatment of Cooling Waters Used for Pumping Engines

By H. M. McCLAIN
Chemical Engineer, Magnolia Petroleum Co., Oklahoma City, Okla.*

This paper presents results of observations made and data taken by the author while engaged in the work of determining the effect that hard water scale has upon the operating efficiency and repair cost of internal combustion engines.

The general problems encountered in the operation of a pumping engine, while using a hard untreated cooling water, are:

1. Replacement of cylinder heads, cylinders, pistons and piston rings.
2. High oil consumption.
3. Low operating efficiency of engines.

It is believed that the scale accumulated in the water jackets of pumping engines creates a high operating cost, and the importance of removing the scale from the water jackets and treating the water to prevent the depositing of the scale has not received sufficient consideration by the operators of pumping engines in the oil fields.

In every case, where the engines have been cleaned of scale, and the water treated, the results obtained in the way of reducing general repair, oil consumption, and increasing the operating efficiency of the engines have been remarkable. This being the case the problem remained to find the most practical and economical method for cleaning the water jackets and treating the cooling water.

Quantity of Heat Absorbed by Cooling Waters

It is obvious that the cooling of an engine depends upon the transfer of the heat developed within the combustion chamber to the water in the water jacket.

The retention of heat within an engine, when sufficient cooling water is available, is caused by an accumulation of a foreign substance, as a scale, in the water jackets, and depends upon the quantity and the insulating property of the chemical ingredients collected as the scale.

The quantity of heat developed within an engine is governed by:

1. Fuel used for operating.
2. The speed of operation.
3. Lubrication.
4. The load carried by the engine.

Table No. 1 gives the comparison of the amounts of heat absorbed per rated horsepower per hour by the water circulating through both the clean and scaled cylinder water jackets and the per cent increase in heat absorbed by the water after removing the scale.

TABLE NO. 1—HEAT (B.T.U.) ABSORBED PER RATED HORSEPOWER BY COOLING WATER

Cylinder No.	Size of cylinder	Before removing scale	After removing scale	Per cent increase
1	45	1,570	2,500	59
2	45	1,990	2,900	46
3	45	820	2,070	150
4	50	1,040	2,090	101
5	50	1,100	2,020	83
6	50	1,530	2,490	63
7	50	1,530	2,300	50
8	40	1,100	1,860	69
9	40	950	1,750	84
10	40	1,040	1,875	80

Lubricating Oil Effect Upon Heat Absorbed by Cooling Waters

The quantity of oil necessary for proper lubrication of an engine, while operating under ideal conditions, depends upon the size, the operating speed and the load being carried by the engine.

In the field, where scale has accumulated in the water jackets, it is general practice to increase this quantity of oil for lubrication, to offset an increase in the operating temperature of an engine.

This practice often results in the using of more oil than is required for proper lubrication.

The excess oil, when burned with insufficient oxygen under high pressure and temperatures, as in an engine cylinder, always deposits a carbon residue upon of oil used for cylinder lubrication, have upon the quantity of heat absorbed by the cooling water. The three engines used for the piston and piston rings with the liberation of large quantities of heat.

Graph No. 1 compares the data of the test on three engines, which determined the effect different quantities of scale in a water jacket, and different quantities the test were operating under identical conditions, however, the water jacket on Engine No. 1 was clean, while the jacket on Engine No. 2 contained a thin coating of scale, and the jacket on Engine No. 3 contained approximately one-fourth inch of scale.

The treated water circulating through the the clean water jacket on Engine No. 1 absorbed more heat than did either of the waters circulating through the water jacket on Engine No. 2, which contained a small coating of scale; and Engine No. 3, which contained approximately one-fourth inch of scale. As the oil for lubricating the cylinder was increased, the water circulating through the clean water jacket on Engine No. 1 absorbed larger quantities of heat than did either of the waters circulating through Engines Nos. 2 and 3. Likewise, the water in Engine No. 2 absorbed more heat than the water circulating through the water jacket on Engine No. 3.

After completing the test, the scale was removed from Engines Nos. 2 and 3, and

(Continued on Page 39)

TABLE NO. 2—OIL CONSUMPTION COMPARISON FOR A ONE-YEAR PERIOD

Cylinder No.	Size of cylinder	Gals. oil used before removing scale*	Gals. oil used after removing scale†	Gals. oil saved per year	Per cent saving in lubricating oil
1	45	372	240	132	35
2	45	373	240	132	35
3	50	372	201	171	46
4	50	372	201	171	46
5	45	372	222	150	40
6	45	372	222	150	40
7	50	408	215	190	46
8	50	408	215	190	46
9	50	408	215	190	46
10	45	372	181	191	51

*Quantity of oil shown was used over a one-year period between July 1, 1931, and July 1, 1932. †Quantity of oil shown was calculated for a one-year period using for a basis the quantity of oil used over a six-month period after treating the water.

*Before Mid-Continent district meeting, A.P.I. Division of Production, Wichita, Kans.

Taxes, Either Directly or Indirectly, Are Cause of Present Low Prices in Petroleum Industry

By E. R. FILLEY
The Texas Company, Tulsa*

The greatest problems confronting us are not those with which the engineers and production men generally concern themselves. We have comparatively little serious mechanical trouble to solve. We can drill our wells and pump the oil with comparatively little trouble. There is no unsolved difficulty of consequence before the producer, pipe line and refinery people or even our sales people, so far as their physical operations are concerned.

The problem throughout the oil business is well known to all of us. It is not a mechanical problem but purely an economic one, a question of our pocketbooks, the cost of our product as compared with its sales price. This group is largely interested in the producing end of the industry. Being producers, there is little that we can accomplish by direct methods with respect to strengthening the price we receive for our crude production.

Tremendous efforts have been made by all operators to reduce their production costs. Any supply store will tell you that the producers have almost ceased to buy new material. Trucking contractors will tell you that the producer has very little work available for him. Labor costs have been substantially reduced and many of us here have had our incomes reduced by reason of wage reductions. Many former oil workers are without employment through the strenuous retrenchment of various producers. Almost every item entering into our costs has been reduced and reduced drastically.

However, there is one item that has not been substantially reduced; in fact in some cases it has been increased. I refer to the item of taxes.

During the prosperous days of our industry it is shown that from the national income $1 out of every $5 went for the support of some governmental operation. With the serious decline in our national income we are advised, on the authority of Merle Thorpe, editor of the Nation's Business, that at this time $1 out of every $3 of our national income goes to pay the cost of some governmental function; that is, it goes for your local, county, city or state activities or to the national government and its multitude of bureaus.

Tax Burden Not Reduced

The increase from one out of five to one out of three shows that the tax burden has not decreased in line with the shrinkage in income, and little has so far been accomplished in reducing the load.

The petroleum industry, together with its customers, the automobile owners and drivers, are carrying an unjustified heavy part of the tax load, and the results of this continuous drain on our industry are beginning to appear plainly; more plainly in our business than in others which do not carry so heavy a part.

It is true that other industries also have their tax loads and to that extent they, too, are hampered in their activities and become less able to buy our products. However, it seems our industry has an unusually large number of taxes. To begin with, all equipment used in the production of oil is taxed at rates varying from 2 per cent to 4 per cent of the assessed valuation and the lease or mere right to operate is also valued and a similar added amount is collected. Some of the equipment in use carried a tax when originally purchased. When the oil is brought to the surface it, too, is taxed, if in lease tankage the first day of the taxable year. Here we have a total of three or possibly more taxes on our activities before the oil is sold, or as some would say, "before we get our feet on the ground."

When the oil leaves the property or lease, the Federal Government places a 4 per cent tax on the cost of transporting it. This is paid by the transporter, but is indirectly charged back to the producer by reason of lowered crude prices. The transporter also pays ad valorem tax on the value of the equipment he uses. Oil is generally gathered into storage tanks at refineries or tank farms. If it is so located on the first day of March each year, it is again taxed on its value as well as on the value of the tanks and tank farm at which it is located.

One Tax on Top of Another

When the oil reaches the refinery, there is added to the cost of refining, a substantial sum representing the tax paid each year on the equipment at the refinery proper.

The manufactured products of petroleum are carried to the markets of the country either by rail or truck. If by rail, the tank cars are taxed and in their freight bill from the railroad company, there is a generous margin to cover the many items of tax our railways must pay. If the movement is by truck, the truck carries a tax of 3 per cent of cost paid by the manufacturer, an ad valorem tax and a state license. It uses tires on which a 2¼-cent per pound tax has been paid and tubes on which a tax of 4 cents per pound is paid. All repair parts and accessories used carry a 2 per cent tax. Even the driver has had to buy a driver's license.

When the products finally reach the filling station the distributor, in some states, has to pay an occupation tax and in all cases an ad valorem tax on his station and equipment. Surely these are enough, but no—we yet have to add 3

*Before Mid-Continent section, A.P.I., Division of Production, Wichita, Kans.

cents per gallon of gasoline for the State of Kansas and 1 cent for the Federal Government plus 4 cents per gallon on all lubricating oils.

If after running the gauntlet of all these items plus other operating expenses, you may have skimmed out a few dollars of profit, the Federal Government takes in income tax about 14 per cent in the case of corporations and from 4 per cent to as high as 63 per cent in the case of individuals.

There is now pending before your legislature a new income tax law, the first ever submitted for the State of Kansas. If it is adopted it will add a further burden to business generally and to the producer who may be able to make a few dollars above his many other expenses and many other taxes.

Is there any wonder that we have discouragement on the part of our industry? That we have the tax evasion racket? That the industry is not moving forward?

You may ask what do all these other taxes have to do with the oil producer. My answer is they are largely paid by the producer. They are paid by the producer in the form of low crude prices. The producer has reduced his cost of production to the lowest figure in years but the price of oil has dropped even farther and faster—so that now the price of oil does not repay the producer's cost. You all agree to this and agree if more revenue can be secured from the oil sold, the industry would rapidly improve, men would be re-employed, new work would start and we could operate without losing money each day. Your prosperity as individuals, and for the companies many of you represent, is directly tied into the price of crude oil.

Taxes Cause of Low Prices

You may say that low crude prices are due to overproduction, but this cause has been largely eliminated by the various restrictive moves of the states and by proration. More rigid enforcement of our proration laws and greater co-operation will further eliminate this cause. We must therefore look elsewhere for the principle cause.

I am forced to return to my first conclusion—that taxes either directly or indirectly are the cause of low prices in the industry. At first glance, it may not readily appear how the price of crude oil is held down by taxes levied on the pipe lines, the refinery, the sales station and their products. It is well understood that no money can be paid for crude oil that is not taken in at the sales station. Therefore, the more money received for our gasoline the more is available to buy and pay for crude oil. We are, therefore, directly interested in maintaining a healthy retail price for gasoline and lubricating oils sold at the filling station.

You are familiar with the various gasoline taxes now levied against gasoline. They range anywhere from 50 to 100 per cent of the value of the product. First of all it is a burdensome tax but worst of all, its lax enforcement encourages its evasion. Evasion gives the lawbreaker an advantage over the legitimate dealer and enables him to cut prices, which in turn brings all to the lower prices. This is an endless chain bringing progressively lower prices and constantly reduces the amount available to pay the refiner for his product.

Your governor seems to have properly analyzed this situation and is asking your legislature for more effective enforcement laws. He has already effected a reduction in automobile and truck licenses and if he can bring about strict enforcement of the gasoline tax laws he will have done two good turns for the petroleum industry. He is to be commended for his efforts and in these moves should have the support of every oil man and motorist.

Now, what happens to the money that comes in at the filling station? First of all, a third to a half of it goes directly to the state and Federal governments as gasoline taxes. Another portion goes to pay the property tax on the retailers' equipment and station. As the meager remainder is passed from the retailer to the wholesaler, from the wholesaler to the refiner, from the refiner to the pipe lines and purchasers; at each step another portion is deducted to pay expenses and the numerous taxes I have mentioned, until by the time it reaches the producer there is little left to cover his many expenses, costs and don't forget his taxes, too.

Now we know the producer is in bad shape and we know that taxes and tax evasion have been the principal causes of his plight. What are we going to do about it? What can we do about it?

I have a few suggestions to offer for the good of all, but being a producer I am primarily interested in his welfare, and my suggestions have a direct bearing on the improvement in his condition.

Need of Co-operation

First of all, we should continue our present efforts to reduce our costs, to reduce the producer's taxes and to regulate the output of our wells by proration and restriction, so that their output will not exceed what we can find a legitimate market for. We should support equitable proration movements and the enforcement officers and commissions trying to bring about the much desired balance between supply and demand.

Now is no time to hesitate in our efforts along these lines, but rather we should stimulate our activities. The operators of Kansas, to an almost unanimous degree, have supported the restrictive and proration moves of the state and your public service commission has been most sincere and co-operative in its efforts to help our industry. These good moves must continue for our welfare and its improvement.

Secondly, we must join with other business men, farmers, laborers and taxpayers in putting pressure to our various public officials to secure general reduction in all taxes. Of course we are primarily interested in reducing those taxes applying to the industry, but we must also help our customers to reduce their burdens. We are all overtaxed and we must all join in the general protest for reduction. Most politicians and public officials are spending their time trying to shift the tax burden from one source to another. This will get us no where. Reduce public expenditures—this will bring about smaller need for taxes and they will automatically come down. Every one of you cast your vote for the various elective officials. Your influence is tremendous if you will but use it. Elective officials are always sensitive to the voice of their constituents. Use your voice and influence. The combined activities of all of us along these lines will be tremendous. And remember you are speaking for your own welfare because the producer pays the tax bill of the industry through lower crude prices.

Third, your co-operation is needed to assist in enforcing the gasoline tax laws. Of course, it is desirable to eliminate or reduce the gasoline tax, but so long as the law is on the books it is essential that it be enforced against all alike. Your effort to assist in its enforcement is an effort to stabilize and improve the price of gasoline and indirectly to stabilize and improve the price of crude. Needless to say, you should all patronize those filling stations where a legitimate product is sold and where the gasoline tax is paid. You should urge your friends to do the same. These stations can easily be identified by the product they handle and the character of the people in charge. Furthermore, if the price they quote for gasoline is much below that asked by the majority of distributors you certainly have reason to inquire the source of their product and to suspect that the proper tax may not have been paid.

Summarizing briefly, our efforts should be directed toward reducing all public expenditures, all taxes and particularly those affecting our industry or product in any way. At the same time we should use our influence to enforce equitably against all the collection of taxes now in force.

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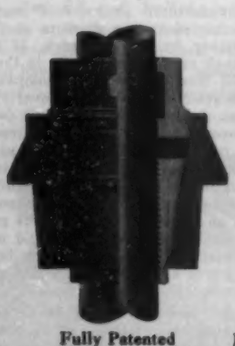
Also in general use, is the HERCULES TUBING ANCHOR. It is in reality a bottom-hole tubing support which eliminates parted tubing trouble, and is positive assurance against dropping tubing while same is suspended, or when being pulled from the well. The Anchor can be run in crooked holes as it is but 24″ in length. The three slips which grip the inside area of the casing eliminate any possible damage to casing should tubing drop. The Anchor is always easily recovered. Ample fluid courses are provided.

Avoid Tubing Accidents—The Anchor serves as a tubing catcher while suspended in well or when being pulled from the well.



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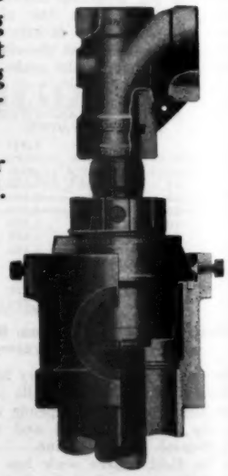


Pumping Well "Hook-up"

Chemical Treatment of Cooling Waters

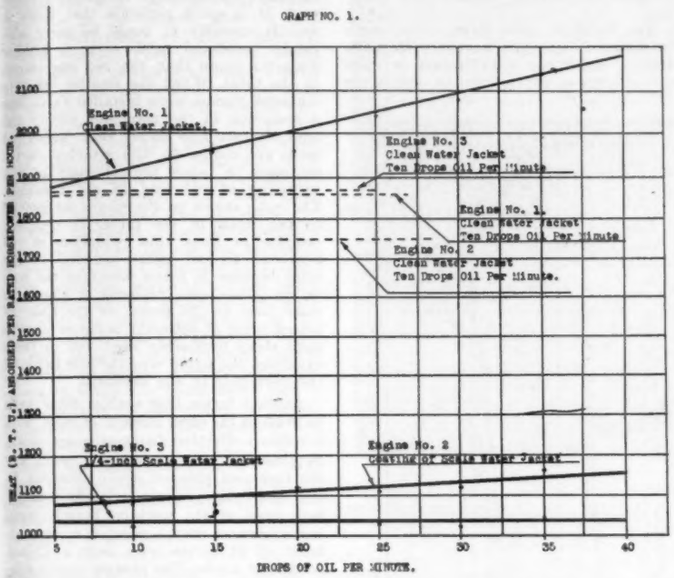
(Continued from Page 37)

upon rerunning the test it was observed that the waters absorbed approximately the same quantity of heat as the water circulating through Engine No. 1. Therefore, the results of tests as shown in the No. 1 Table and Graph indicate that the scale accumulated in water jackets of pumping engines does affect the transfer of heat from the engine to the cooling water.

Economies in Engine Operating Expense

By comparing the operating conditions before removing the scale with those existing after, the relation of the heat

GRAPH NO. 1.



retained within an engine to the operating repair cost can be determined.

Table No. 2 compares the quantities of oil required for lubricating the engine cylinders for a one-year period while operating before and after the scale was removed from the water jackets. It also indicates the savings in lubricating oil per year per engine cylinder.

The repair cost of some of the engines included in this paper has been excessively high. This engine expense has been partly due to the fact that the engines are operating at a high rate of speed and carrying a capacity load which creates a natural depreciation; however, the repair costs of these engines are apparently in proportion to the quantity of scale accumulated in the water jackets.

Table No. 3 compares the engine repair costs for a one-year period for several engines included in this article. These repairs were considered as an average for those engines for every like period of time while using the same supply of water.

TABLE NO. 3—ENGINE REPAIR FOR A ONE-YEAR PERIOD

Engine No.	Cylinder head	Cylinders	Pistons	Set piston rings	Days labor*
1	1	1	1	4	10½
2	1	1	1	4	10½
3	1	0	0	0	1
4	1	1	1	1	2
5	0	0	0	2	4
6	0	1	1	3	10
7	0	0	0	1	10
8	0	1	1	4	0

*A part of the labor shown was for removing, by mechanical method several accumulations of scale from the water jackets.

As yet the comparative cost data for those engines included in Table No. 3, while operating with a treated cooling water, are not available, because those engines have only operated approximately six months with a treated cooling water. Therefore, an accurate comparison of the data can not be made at this time; however, to date there has been a noticeable decrease in the necessary repairs. There has been no replacement of cylinders, cylinder heads, pistons or piston rings for these engines, and at the time of writing this article they were in good operating condition, and will apparently continue to operate for some time before needing repairs.

Before treating the water, it was a common occurrence to have an engine run hot and, eventually, go down, from overheating.

These engines, and especially those that are operating at a high rate of speed and carrying a capacity load, since treating the cooling water, have operated continuously and at a much lower temperature.

Chemical Treatment

Various methods have been tried for cleaning the water jackets and treating the waters for pumping engines. Some of these methods have proved to be practical and economical, while the other methods tried, entailed considerable expense and proved to be impracticable.

The method selected at this time for removing the scale from water jackets consists in the treatment of the water in the circulating tank with a commercial chemical compound which has been reported to contain approximately 70 per cent tannin. The treatment requires from 8 to 12 weeks for cleaning the water jackets; however, where speed of cleaning is desired or where large quantities of scale has accumulated in the water jackets the time required for cleaning can be reduced to approximately 10 days by adding to the water sufficient amounts of sulphuric acid to convert the scale-forming salts over to the nonscaling sulphate salts.

The cleaning cost per engine, when using the tannin compound will average between 75 cents to $1.50; while the combination of the sulphuric acid and the tannin compound for cleaning will cost between $1.25 and $2.50 per engine.

After cleaning the water jackets, the treating of the makeup water with the tannin compound, which will prevent the depositing of scale, will cost between .015 and .03 cents per 1,000 gallons.

Conclusion

The chemical treatment of cooling water is the response to the requests of superintendents and operators for a relief in the high repair costs, of internal combustion pumping engines.

The chemical treating of the various waters for the respective engines has obtained satisfactory results.

Acknowledgment

The writer wishes to express his appreciation to the superintendents and operators of the engines of the Magnolia Petroleum Co. for their co-operation and work given in conducting the tests for this paper.

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Proper Diameter Pump for Oil Well and Rough Method to Use to Determine the Diameter

By AUSTIN ALLEN, Jr.
Phillips Petroleum Co., Bartlesville, Okla.*

Oil wells that are produced by pumping may be roughly classified into two divisions.

The first division includes those that must periodically take a potential and produce interim at a prescribed rate, as ordered by the proration authorities. These wells must be equipped so as to produce a maximum amount of oil during the potential period at a reasonable expense, and the allowed oil at a minimum expense. In some fields proration regulations specify the maximum size of some of the equipment to be used, as tubing size, length stroke, and the operators are necessarily limited accordingly in their choice of machinery, but as the potential of fields such as these decrease there will come a time when these maximum limitations are no longer applicable and it will become necessary to use the same logic in installing pumping equipment that is used in fields not so regulated. It will be necessary to choose a pump of an effective diameter large enough to produce the fluid but not so large that it will cause an excessive number of sucker rod fractures. It will be necessary to choose a pumping stroke of sufficient length to minimize the amount of lost pump plunger travel over a unit of time, and for a reasonable sucker rod load. In other words, prorated wells must be equipped to satisfy the requirements of proration, and the demands of good operating and engineering practice.

The second division includes those wells that produce the marginal allowable or less, "strippers," wells that must be equipped to produce at the point of greatest net return.

Situation on Stripper Leases

During the last few years the margin of profit between lease revenue and lease operating expense, on the so-called "stripper" leases has constantly been reduced until now it is very slight, if not a loss. The prime cause of this reduction is, of course, the reduced price of oil. The secondary cause is the reduced quantities of oil that can be produced from the properties because of their increased age. The ability of the operator to either improve the general production status of the lease, or to reduce its operating cost is his only method of retaliating.

One of the more important constituents of operating cost is the actual cost of pumping the well. The cost of keeping the pump in service, the cost of keeping the sucker rods, rig front, belts, countershaft, clutch and engine running. In the past because of the higher price obtained for the oil produced there has been a strong tendency to overlook this cost, probably rightfully, considering instead only the value of the oil lost during down time. But now it has become necessary to give due consideration to the cost of the material and labor used.

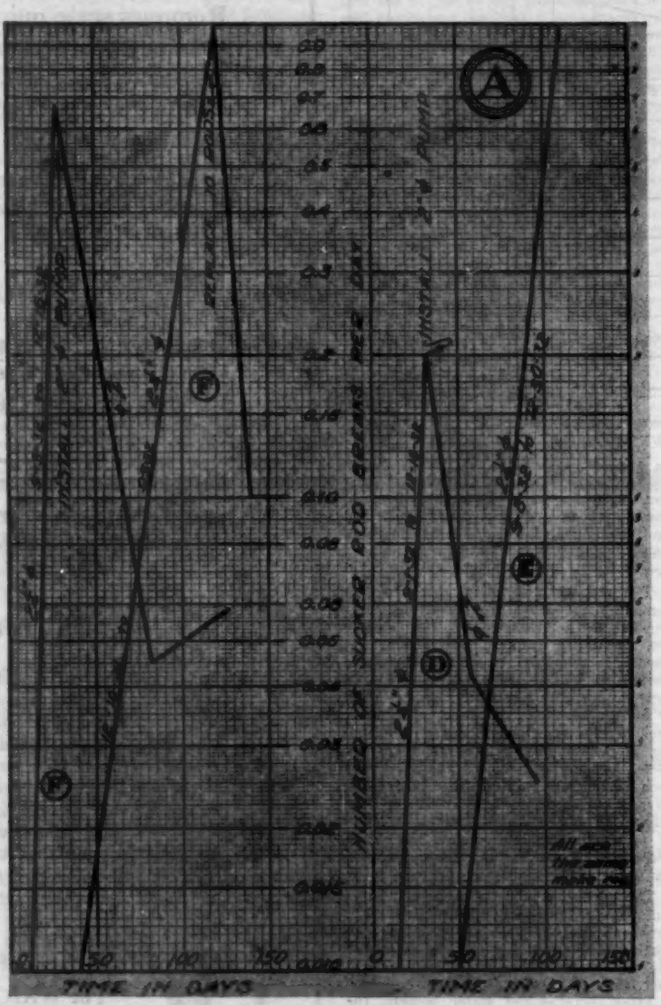
Unfortunately, the saying that a chain is as strong as its weakest link still holds true in a pumping well, and usually in the average heavy well the weakest link turns out to be the sucker rods. The manufacturers of sucker rods assures us that with the present knowledge of metallurgy, with the present methods of manufacturing, and at a reasonable cost it is impossible at the present time to supply us with a sucker rod capable of withstanding the type loads and conditions to which a rod sometimes is subjected. Consequently, the cost of keeping sucker rods in operation is a considerable item in these wells, and we must in some manner reduce the loads on these rods in order to receive satisfactory service from them.

Reducing Rod Breakage

Given the same surface equipment with reasonable flexibility as to the length of pumping stroke, and the number of strokes per minute at which the well can be pumped, there are several ways of reducing this sucker rod breakage. Either by slowing down the well and increasing the volumetric efficiency of the pump by keeping the pump in a better state of repair which usually requires more well servicing. By increasing the length of stroke and reducing the number of strokes per minute which practically always causes more surface rig trouble, and usually requires smaller pulley size and more surface counterbalance and heavy equipment throughout. Or to reduce the effective diameter of the pump and use a slightly longer stroke, if necessary.

By using a pump of smaller effective diameter the upstroke load is reduced, while the downstroke load remains approximately the same, thus materially reducing the amount of counterbalance required, and enabling the prevailing type counterbalance, that is dead load and crank, to more closely balance the well, allowing a more uniform flow of power through the surface transmission equipment.

The following table gives several wells in which it was not necessary to materially increase the length stroke or number of strokes per minute to obtain the same fluid from the well as was previously produced with the larger effective diameter pump.



In wells A, B and C the apparent volumetric efficiency was increased showing the possibility that these wells had been pumped with a working barrel of excessive displacement or effective diameter. It is quite probable that wells A and B, possibly C, could be more efficiently produced with even a smaller diameter pump than the last one shown in the table. When the smaller effective diameter pumps were installed there was a reduction in the maximum sucker rod load of from 6 to 22 per cent. These rod loads are computed. The attached curves on sheet "A" show the reflection of this reduction of rod load in rod breakage. The wells shown on the curves correspond to the wells in the table. It was not possible to show this reduction in rod breakage for all wells included in the table because in many instances the rods or rig fronts were replaced at about the same time as the pump, or the rods replaced were of different make or quality than those previously used, but in these examples the pump was the sole cause of the reduction in rod breakage.

Another factor that enables these wells to produce the same amount of fluid, with a reduced effective diameter pump at approximately the same pumping speed, was the increased plunger stroke obtained. In one case the plunger actually bumped both ends of the working barrel, showing a plunger stroke relative to the cylinder of 84 inches with only a 72-inch polish rod stroke. The plunger stroke relative to the working barrel was found to increase at a rapid rate after twenty-two 72-inch strokes per minute was reached. (See curves on Sheet "D".) This condition brings out the possibility of running the well at a speed at which the deceleration of the sucker rods during the lower half of the downstroke is sufficient to throw them into enough tension as they come to a stop at the bottom of the stroke to insure that they will be more elongated at the bottom of the plunger stroke than at the top, thus giving greater plunger travel for the same maximum rod stress. However, this maximum load will be imposed on the sucker rods twice during the pump cycle rather than once, as is the usual case under normal pumping speeds and length strokes. But as the ability of steel to withstand repeated loads varies approximately inversely as the square of the loading above the fatigue limit in a given medium and approximately inversely only as the number of repetitions, it is quite possible that the lower maximum rod stress obtained with a smaller diameter pump will more than counteract the greater number of times at which the rods are subjected to this stress. The sucker rod operation curves (See curves on Sheet A) substantiate this. Although this same condition could be obtained with the larger diameter pump the sucker rod

TABLE "F"

Well	Effective diameter of pump (inches)	Total fluid produced per 24 hrs. (bbls.)	Strokes per minute	Length polish rod stroke (inches)	Apparent volumetric efficiency per cent	Sucker rod load (lbs.)	Reduction in rod load per cent
A	2¼	350	20	72	41	14,300	0
A	2¼	350	22	52	52	13,700	4
A	2	350	18	72	58	12,300	14
B	2¼	200	20	44	39	12,500	0
B	1-25/32	200	16	44	61	9,700	22
C	1-25/32	120	15	34	50	9,900	0
C	1½	120	19	34	71	8,900	10
D	2½	744	24	72	73	19,200	0
D	2	820	25	72	98	18,100	6
E	2¼	730	22	72	78	15,700	0
E	2	730	23	72	96	14,300	9
F	2¼	731	22	72	78	16,800	0
F	2	731	24	72	91	16,000	4

*Presented before A.P.I. Mid-Continent section production meeting, Wichita, Kans., February 17-18, 1933.

loads would be so high that it would be impossible to keep the rods together, as the curves indicate, and the lost production incurred during this down time is usually sufficient to counteract the increased rate of production obtained. So it has been found in wells such as these, approximately 3,000 feet deep, with a small percentage of oil and very little gas, that a 2-inch effective diameter insert pump will handle as much fluid at less cost over a given period of time than the 2¼-inch full size pump.

Pumping Dead Fluid

An attempt was made to pump a well 3,000 feet deep, 100 per cent salt water, with a 2¼-inch effective diameter pump, 25 strokes per minute, and 72-inch polish rod stroke. It was impossible to keep the rods in the well, the handwheel sheared the bolts in the flanges, and the belt, engine, countershaft and clutch gave excessive trouble. This experience shows that it will be necessary to install heavier equipment and use a stroke longer than 72 inches to satisfactorily handle over 700 bbls. of dead fluid per day at this depth. We believe that more fluid would have been pumped per week with a 2-inch effective diameter pump in this well than with the 2¼-inch pump used. However, the experiment was not made.

These increased apparent volumetric pump efficiencies, or the use of pumps of proper effective diameter have many other operating advantages. The barrel fills more regularly which reduced scoring, and the relative strength of the smaller valves, cups and fittings is greater, thus insuring slightly longer operations without failure. Another advantage, especially where the pump being used is much too large for the well, is the ability to materially reduce the loads on the surface equipment.

There are many examples in the older fields of equipment working under excessive loading. Engines, although of sufficient power when the well was new and the volume of gas produced was sufficient to aerate the column of fluid, are now overloaded. Pulley ratios are too low, causing bad engine and well speeds. Rig fronts and belting are much too light for the load. This overloading is causing higher operating cost than is really necessary, because of the excessive trouble resulting therefrom. Let us assume a well 3,000 feet deep equipped with 2-inch tubing; 4-hole crank; three-quarters-inch sucker rods; 1 25/32-inch effective diameter common working barrel; production 50 bbls. of fluid, mainly water, per day; 18 strokes per minute; 34-inch polish rod stroke; in which the surface equipment is giving more trouble than is necessary.

$$\text{Apparent Volumetric Efficiency} = \frac{50}{0.37\times18\times34} = 22\%$$

$$\text{Sucker Rod Dead Load} = 1.62\times3{,}000 = 4{,}860 \text{ lbs.}$$

$$\text{Maximum Polish Rod Acceleration} = 5.2 \text{ ft. per sec. per sec.}$$

$$\text{Sucker Rod Live Load} = 1.17\times4{,}860 = 5{,}680 \text{ lbs.}$$

$$\text{Fluid Live Load} = 1.17\times0.433\times(2.492-0.441)\times3{,}000 = 3{,}100 \text{ lbs.}$$

Assume friction to be 500 lbs.

Total Maximum Live Load = 9,280 lbs.

Effect of gravity on counterbalance =

$$\frac{Wa}{g} = \frac{5.2W}{32.2}$$

Where W = effective weight of counterbalance.

a = acceleration at point of maximum load.

g = acceleration of gravity (32.2 ft. per sec. per sec.).

Maximum upstroke unbalanced load =

$$9{,}280 - \left(\frac{W - 5.2W}{32.2}\right) =$$

Maximum downstroke unbalanced load =

$$W + \frac{5.2W - \left(\frac{4{,}860}{1.17} - 500\right)}{32.2}$$

Solving: W = 6,470 lbs.

Then: $\frac{5.2W}{32.2} = 1{,}040$ lbs.

Maximum unbalanced loads = 9,280 — (6,470 — 1,040) = 3,850 lbs.

If the same computations are made for a 1⅛-inch effective diameter pump, and then with the smaller pump and five-eighths-inch sucker rods, the following results will be obtained:

TABLE "G"

	1	2	3
Sucker rod size (in.) ..	0.750	0.750	0.625
Effective pump diameter (in.)	1.781	1.188	1.188
Apparent volumetric eff.	22%	50%	50%
Max. sucker rod stress (lbs. per sq. in.)	21,000	16,300	17,600
Reduction in sucker rod stress	0	22%	16%
Max. unbalanced rig load (lbs.)	3,850	2,650	2,065
Reduction in rig load ..	0	31%	46%
H.p. required at polish rod	5.6	2.6	2.5
Reduction in polish rod h.p.	0	53%	55%

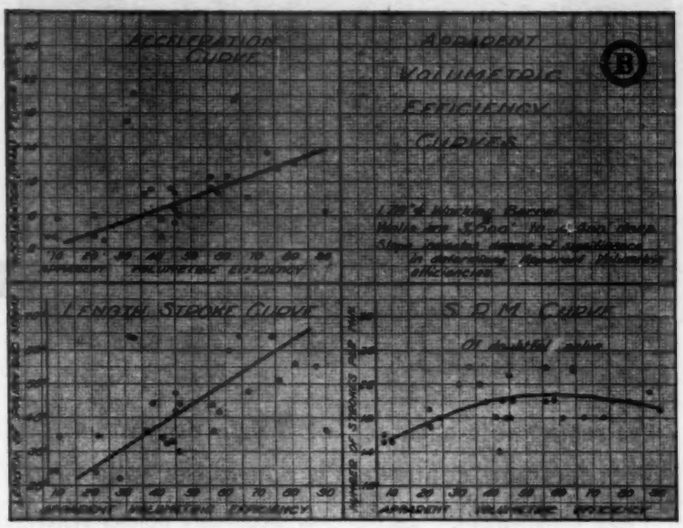
Proper Effective Diameter

It may be seen from the above that the simplest method of reducing the sucker rod load and the surface equipment load is to install a pump with the proper effective diameter.

It is an easy matter to compute the apparent ideal displacement of a pump, i.e., the displacement of a pump with the effective diameter known, the length of stroke of the pump relative to the ground assumed to be equal to the polish rod stroke, and no allowance made for fluid slippage past the seal or the valves of the pump. I find that the attached table facilitates this computation. This apparent displacement must be corrected by a factor called the apparent volumetric efficiency to obtain the actual recovery of fluid per day that the pump chosen will put out.

This apparent volumetric efficiency is determined by the following factors: Fluid level, gas produced, depth of a well, friction of pump, friction of fluid passing through pump, straightness of the well, length of stroke and number of strokes per minute. As a general rule wells of high fluid level will permit pumps to function with higher apparent volumetric efficiency than those of low fluid level. We have observed many wells in which the pumping fluid level is high and which were producing a gas-free fluid with an apparent efficiency ranging from 90 to over 100 per cent. We have other wells in which the pumping fluid level is so low that you can tell the condition of the pump by observing the manner in which it is pounding. In these wells the apparent efficiency ranges from 10 to 30 per cent. Both classes of wells being produced at what we consider a maximum economic rate with the machinery with which they are equipped.

Gas is probably the most doubtful item in estimating what apparent volumetric efficiency can be expected from a given diameter pump. It may cause gas lock, or may aerate the column sufficiently to materially reduce the load. A gas anchor may help and may not. Usually the presence of gas tends to decrease the apparent efficiency. On the attached curve, sheet "D," the top well labeled "D" corresponds to the well so labeled in Table "F." Although wells 1, 2 and 3 have comparative maximum loads and are of comparative depth it will be noticed that the load at the bottom of the stroke at 25 strokes per minute is only 2,500 pounds greater than the load at the top of the stroke in Curve 1, 6,000 pounds greater in Curve 2 at 27 strokes per minute, and 7,500 pounds greater in Curve 3 at 26 strokes per minute. Maximum acceleration at these speeds is in the order named—25.0, 25.2 and 23.7 feet per second per second. The maximum variation is 6 per cent, while the differential loads may vary as much as 300 per cent. If the modulus of elasticity of these three sucker rods strings (not to be confused with the modulus of elasticity of steel) were the same it would be natural to suppose that the amount of increased plunger travel would be proportional to this load differential.



Wells 1 and 2 are equipped with the same make of rods. These rods had been in the wells for about the same length of time when the tests were made. As the pumping speeds are about the same and both wells fairly straight, it is safe to assume that the modulus of elasticity for the two strings of rods is approximately the same. If this is so, then Well 2 has a proportionally longer plunger stroke than Well 1, but the apparent volumetric efficiency of Well 2 is less than Well 1. As Well 2 produces considerable gas through the tubing and is pumping by heads, this appears to be a clean-cut example of where gas materially reduces the volumetric efficiency of the pump. As this gas also reduces the maximum sucker rod load (if Well 2 were producing fluid of specific gravity equal to 1.0 the load is estimated to be 26,000 pounds), it may be seen that the presence of any material quantity of gas enables the operator to use a relatively larger pump diameter with reasonable sucker rod breakage.

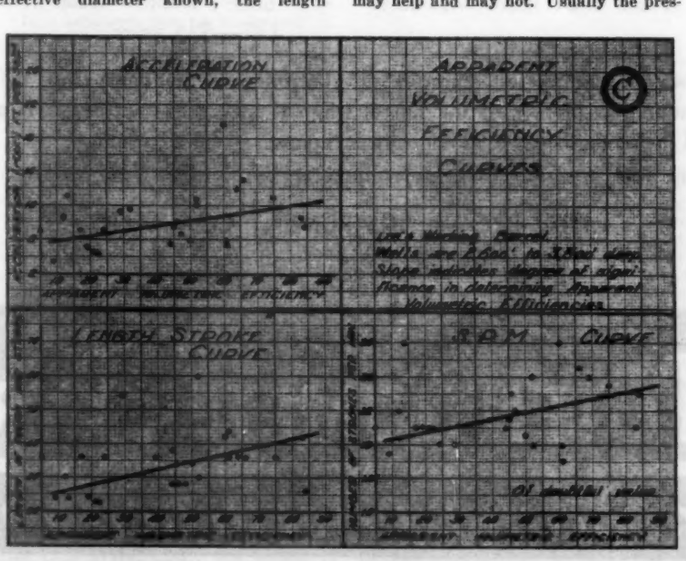
It is possible that in these Curves 1, 2 and 3 the difference in this differential load may be attributed to the friction of the plunger in the cylinder. One is a cup pump; two is a plunger pump with 0.007 inch clearance; three is a patented pump that is considered very "free running."

Curve 3 shows a maximum load of more than 2,500 pounds greater than this load should be. This is probably caused by the crooked hole. We know that the 1¼-inch pump installed in this well is the largest effective diameter pump that can be used without excessive rod trouble. So in this case we have been able to counteract a detrimental effect of the crooked hole by obtaining greatly increased plunger travel, through the use of a smaller diameter pump that is practically frictionless, high pumping speeds, and long stroke.

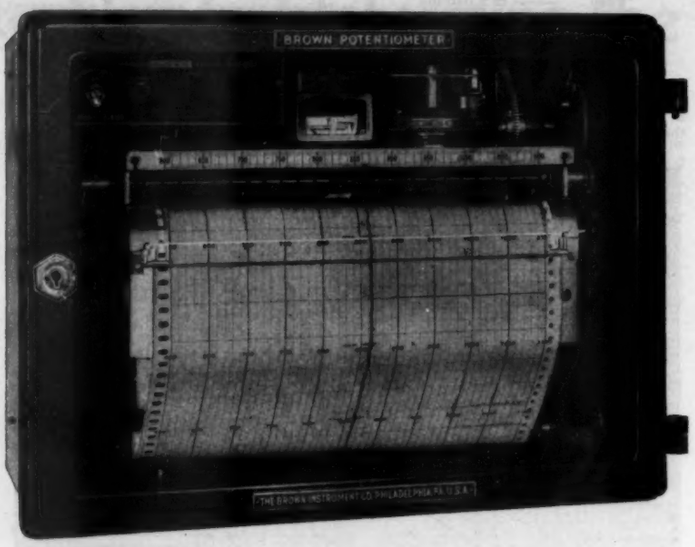
Lost Plunger Stroke

With normal pumping speeds, maximum polish rod acceleration of 4 feet per second to 12 feet per second per second, or fourteen 30-inch strokes per minute to twenty 54-inch strokes per minute. Curves B and C attached may be used to assist in computing lost plunger stroke. These curves were derived by plotting wells of comparative depth and similar subsurface conditions. They were made up in an attempt to learn whether the length stroke or the number of strokes per minute, or a combination of both, was most significant. A glance at the curves will show that the length stroke has more bearing on the apparent volumetric efficiency than the others, and that the deeper the well the greater will be its effect. The other curves do not appear to be of much consequence, although it will be noticed that as the maximum acceleration increases, or the number of strokes per minute increases, the apparent volumetric efficiency also increases. It is interesting to note that the average apparent volumetric efficiency for the 3,600-foot to 4,400-foot wells is 47.2 per cent, while it is only 41.2 per cent for those ranging from 2,600 feet to 3,500 feet in depth. This brings out that the deeper wells demand more care

(Continued on Page 48)



*Accurate to 1/5 of 1%



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4. Oil immersion of slide wire—(A) eliminates wear resulting from the contact brush riding on the slide wire, (B) protects the slide wire from corrosion and dirt and thereby prevents high resistance contacts.
5. Positive drive mechanism with non-slip clutch eliminates lost motion and variation in response, due to wear. It takes its smallest step of 1/1200th of the chart space with absolute definiteness.
6. Secondary pointer system relieves galvanometer pointer of all strain and produces large mechanical movements for actuating the drive mechanism, eliminating the need for microscopic mechanical movements.
7. Humidity chart compensator corrects for changes in width of chart due to changes in humidity of surrounding air. Without this compensation, errors up to 1% (15° at 1500°) can occur with changes from 10 to 90% in atmospheric humidity.
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Suggested Basis for Ratable Take Equities in the Western Panhandle Sweet Gas District

By J. D. THOMPSON, Jr.[1] and J. E. WARREN[2]

[1]Consulting Geologist, Amarillo, Tex.; [2]Panhandle District Superintendent, Continental Oil Co.*

The Panhandle sweet gas field, comprising an area of approximately 1,000,000 acres, lies on the crest and higher portions of a very large anticlinal fold extending in a southeasterly direction for a distance of more than 100 miles from southeastern Hartley County through portions of Moore, Potter, Hutchinson, Carson, Gray and Wheeler Counties in the Panhandle of Texas. For administrative purposes, this field has been divided by the Railroad Commission of the State of Texas into the East Panhandle Field, embracing eastern Gray County and Wheeler County, and the West Panhandle Field, embracing all of the sweet gas producing territory lying west of that area. Extensive areas yielding sour gas and petroleum have been developed on almost the entire northeast flank of the major anticlinal fold. The petroleum and sour gas found in these areas are produced from the same horizons which produce sweet gas in the sweet gas field, the petroleum and sour gas merely occupying a lower position structurally in the same formations.

Description of Gas Reserve

The volume of recoverable gas in the Panhandle sweet gas field is tremendous. Estimates ranging from 14,000,000,000,000 to 20,000,000,000,000 feet have been made by various engineers as to the amount of recoverable gas contained in this reservoir. The writers believe that an ultimate production of at least 16,000,000,000,000 feet of gas from this area is an entirely conservative estimate.

Gas is being produced from four distinct geological horizons in this field.

The highest formation to produce gas is a series of thin sandstones in the lower portion of the Permian Red Beds. This productive zone is of only small and local importance as a gas reservoir.

The next formation which acts as a reservoir for gas in this field is a gray-brown dolomite limestone of Lower Permian Age. This pay horizon occurs over wide areas and often contains several producing zones. Porosity conditions in this formation are consistently good and in places very high. It may be regarded as the most important source of gas in the field.

Below the Brown Dolomite, stratigraphically occurs the "Granite Wash" sand formation of probable Pennsylvanian Age. The Granite Wash occupies a marginal position in the field and is often high in porosity and pay thickness, which makes it an important source of gas in certain parts of the field.

The "White Limestone" formation of Pennsylvanian Age, which was deposited to a large extent contemporaneously with "Granite Wash" sands, is another important source of gas production. This formation contains rather inconsistent porous horizons and occasionally fissured or cavernous conditions from which it produces considerable quantities of gas, particularly in Moore County and western Hutchinson County.

The gas produced in this field has a specific gravity varying from .63 to .70. Its B.t.u. value ranges from 960 to 1,020 per 1,000 feet and its gasoline content ranges from .28 to .48 gallon per 1,000 feet.

According to the latest figures filed at the office of the Railroad Commission of the State of Texas, there are 317 completed gas wells in the West Panhandle sweet gas field. These wells have a present aggregate open flow volume of slightly more than 7,600,000,000 feet of gas per day.

The dry hole hazard in the West Panhandle sweet gas field is negligible. To date, no absolutely dry holes have been drilled. Throughout the entire area the initial open flow volumes of the wells so far drilled have ranged from 5,000,000 to more than 100,000,000 feet. The average open flow volume for all of the wells in the West Panhandle sweet gas field is approximately 24,000,000 feet per day. The present rock pressures of the wells in the field vary from 250 to 428 pounds per square inch, the average for the field being about 388 pounds per square inch. These wells vary in depth from approximately 1,650 feet to slightly more than 3,000 feet. According to depth, drilling costs range from $17,000 to $26,000, a fair average cost being $22,000 or $23,000.

It is estimated that up to January 1, 1933, gas withdrawals from the entire Panhandle Field total more than 3,400,000,000,000 feet. Of this amount, by far the largest part was withdrawn in the oil and casinghead gas producing areas and the result is a very decided pressure differential between those areas and the adjacent sweet gas area. A rather unique condition was early recognized in regard to the rock pressure of the gas in this field. It was found that a practically constant subnormal pressure of 430 pounds per square inch prevailed throughout this vast territory regardless of geographical position. This held true also regardless of which of the various producing formations were encountered, and regardless of depth, indicating an effective connection throughout the field both vertically and laterally. As a result of the huge withdrawals to date, a pressure gradient has been established varying from slightly less than 430 pounds per square inch in the least developed portions of the sweet gas area to less than 100 pounds per square inch in the oil fields. Rock pressures on the northeast edge of the sweet gas field near the oil fields have declined to points ranging from approximately 200 pounds to 350 pounds per square inch. This gradient is sufficiently regular so that pressure conditions in undeveloped areas may be accurately expressed by pressure contour lines. It is also possible, although with a less degree of accuracy, to express expected open flow volumes in such areas by means of contour lines.

TABLE 1

THIS TABLE SHOWS MAXIMUM NUMBER OF WELLS WHICH CAN BE AMORTIZED AT DIFFERENT PRICES OF GAS AND RATES OF TAKE, AMORTIZATION BASED ON FIVE-YEAR PAYOUT AND SIX PER CENT INTEREST

Gross daily take	Daily gross	Daily net	Annual net	No. wells Init. cost, $20,000 plus int., $26,000	No. wells Init. cost, $23,000 plus int., $29,400	No. wells Init. cost, $26,000 plus int., $33,800
Price of gas—2 cents—						
200,000,000	$4,000	$3,500	$1,277,500	245	217	189
250,000,000	5,000	4,375	1,596,775	307	271	236
300,000,000	6,000	5 250	1,916,250	368	325	283
400,000,000	8,000	7,000	2,555,000	491	434	378
500,000,000	10,000	8,750	3,193,750	614	543	472
600,000,000	12,000	10,500	3,832,500	736	651	567
Price of gas—4 cents—						
200,000,000	$8,000	$7,000	$2,555,000	491	434	378
250,000,000	10,000	8,750	3,193,750	614	543	472
300,000,000	12,000	10,500	3,832,500	736	651	567
400,000,000	16,000	14,000	5,110,000	982	869	755
500,000,000	20,000	17,500	6,387,500	1,228	1,086	944
600,000 000	24,000	21,000	7,665,000	1,472	1,302	1,134
Price of gas—6 cents—						
200,000,000	$12,000	$10,500	$3,832,500	736	651	567
250,000,000	15,000	13,035	4,790,525	921	814	708
300,000,000	18,000	15,750	5,748,750	1,104	976	850
400,000,000	24,000	21,000	7,665,000	1,473	1,303	1,133
500,000,000	30,000	26,250	9,581,250	1,842	1,629	1,416
600,000,000	36,000	31,500	11,497,500	2,208	1,953	1,701
Price of gas—8 cents—						
200,000,000	$16,000	$14,000	$5,110,000	982	869	755
250,000,000	20,000	17,500	6,387,500	1,228	1,086	944
300,000,000	24,000	21,000	7,665,000	1,472	1,303	1,133
400,000,000	32,000	28,000	10,220,000	1,964	1,738	1,510
500,000,000	40,000	35,000	12,775,000	2,456	2,172	1,888
600,000,000	48,000	42,000	15,330,000	2,944	2,604	2,268

Available Markets

The West Panhandle sweet gas field is served by five major pipe line companies as indicated below:

Name—	Size (in.)	Length (miles)	Capacity in million cu. ft. per day
Texas Interstate P. L. Co., Panhandle Eastern P. L. to Indiana, June, 1931	24	1,100	150
Natural Gas Corp. of America, Texoma Natural Gas Co., to Chicago, October, 1931	24	925	175
Northern Gas & P. L. Co., Missouri Valley P. L. Co., to Des Moines and Wisconsin, May, 1932	24	850	150
Cities Service Gas P. L. Co., to Kansas City, February, 1928	20	400	125
Southwestern Development Co.:			
Canadian River Gas Co., to Denver, June, 1928	22–20	365	100
Panhandle P. L. Co.	8	27	12
To Amarillo	6	40	3.5
Amarillo Oil Co., to Amarillo, 1921	12	45	20
South Plains P. L. Co., to Midland, January, 1928	16	260	25
			760.5

During the year 1932 the total withdrawals of gas from the West Panhandle sweet gas field for pipe line use was approximately 77,653,000,000 feet, or a daily average during the year of 212,165,000 feet per day. It is interesting to note that the average daily take during the year was only about 2.8 per cent of the total open flow volume already developed in the field. What the future markets for pipe line gas will be is problematical, but a revival in general business conditions should eventually bring the demand up to approximately 500,000,000 feet per day. It is only logical to assume that any further extensions of the present available pipe line markets may be more economically accomplished by the present pipe line interests than could possibly be accomplished by an individual effort originating in the sweet gas area of the Panhandle of Texas.

Ownership of Reserves

There are approximately 730,000 acres of proven sweet gas land in the West Panhandle Field, of which the five major pipe line companies own approximately 560,645 acres, or 76.8 per cent. The remaining 169,355 acres are largely owned by small independent companies and a few large oil companies. According to the latest figures compiled by employes of the Railroad Commission of the State of Texas, the five major pipe line companies own 261 wells in this area, with a total open flow volume of 6,068,464,000 feet per day, or 79.48 per cent of the total open flow volume of the field. The remaining 56 wells which are unconnected have a total open flow volume of 1,566,585,000 feet of gas per day, which represents 20.52 per cent of the total open flow volume of the field.

Present Distribution of Production to Market Demand and Its Resulting Effects

Nearly all of the gas now being produced and transported by pipe lines from the West Panhandle gas field is produced from wells owned by the pipe line companies. The few exceptions to this general practice are due to contracts that some of the companies have made in the past which bind them to the purchase of gas.

Since the gas pipe lines serving the field afford the only available lawful market, the result is that the owners of gas acreage and wells who are not affiliated with a pipe line are without market outlet. If this condition prevails throughout the history of the field, the drainage of gas from unconnected leases to those leases that do enjoy a market outlet will result in the eventual confiscation of gas values of all unconnected leases. The greater part of the drainage now existing is due to the production of gas with oil in the Panhandle oil field, which is adjacent to the West Panhandle sweet gas field. The Railroad Commission of Texas has recognized the utilization of gas produced with oil as being a proper use when the gas is processed through a casinghead gasoline plant and the residue gas is consumed in some useful manner. Most of the residue gas from casinghead gasoline plants is consumed in the manufacture of carbon black.

The owners of gas leases who do not have a lawful market for their gas are experiencing drainage from two different sources. First, they are being drained to a large extent by the production of casinghead gas in the oil field and second, they are being drained to a smaller degree by the producers of gas for pipe line purposes. The present method of withdrawal is also responsible for inequities in the take from leases owned by the pipe line companies. Certain portions of the field are enjoying, at the expense of royalty owners in other portions of the field, a take greater than they are entitled to. This inequity is compensated to a large extent by the payment of annual lease rentals.

As stated in the preceding paragraph, the owners of gas acreage who do not have an outlet are suffering drainage

*Before Mid-Continent district of Production Division, American Petroleum Institute, at Wichita, Kans., February 18, 1933.

The author's title for this paper is "Ratable Take Equities in the West Panhandle Sweet Gas Field."

which will eventually result in confiscation. Recognizing this fact, they must either secure some sort of market for their gas or lose their investments. If relief cannot be provided by the gas pipe line companies, their only recourse will be to construct casinghead gasoline plants and process their gas for gasoline content, allowing the residue to blow to the air.

Proposed Legislation

The use of gas for casinghead purposes alone has been declared unlawful by the state legislature but bills are now pending in the present legislature to amend the waste statutes so that gas containing hydrogen sulphide can be processed lawfully for gasoline content and the residue blown into the air. As the sour gas area in the West Panhandle Field is part of the same pressure reservoir as the adjacent sweet gas area to the southwest, the production and waste of gas containing hydrogen sulphide will result in drainage from the sweet gas area. It is only a logical step from allowing sour gas to be utilized for casinghead purposes to extending the same privilege to owners of sweet gas leases who have no other means of providing a market for their gas. If the present situation finally results in allowing gas to be processed for casinghead gasoline content, and permitting the residue gas to escape into the air, the Texas Panhandle will be the scene of the most stupendous example of physical waste of gas ever experienced since the inception of the gas business.

The Texas Legislature, in recognition of the conditions existing in this and other fields, have passed statutes with the object of bringing about a fair withdrawal of gas from properties of all the owners of gas interests. The Texas Railroad Commission has issued orders at various times purported to accomplish this same purpose. The theory on which the legislature has drawn ratable production laws is as follows: The gas pipe line companies control all of the markets for the gas which can be lawfully produced in the West Panhandle sweet gas field. It follows that if gas is not taken ratably that drainage will occur and eventually confiscate the gas under those leases which cannot be provided with a market. The laws are, therefore, designed to protect the correlative drainage rights of the various operators in the field. Granting that this theory is correct, the Railroad Commission has not written rules which give due consideration to the fundamental principles involved. The theory of drainage applies to the equitable protection of available reserves, and if orders or regulations by state bodies are not based on the principle of allowing drainage protection to all of the available reserves, they then fail in their purpose.

Production Control

Production control must be accomplished at the wells which are capable of producing gas. Early orders issued by the Railroad Commission to accomplish ratable taking were based on the open flow potentials of the various wells in the field. Subsequent orders of the commission are based partly on the open flow potentials of the various wells in the field and partly on a limited amount of acreage. It is the purpose of this paper to point out the fallacy of using the producing ability of a well as a yardstick in determining the correlative drainage rights between producers and to point the way to the accomplishment of an equitable and workable plan. As pointed out in the early part of this paper, the open flow capacity of wells now completed is far in excess of the available market outlet. Additional drilling in the field at the present time is not necessary to satisfy the available market but only necessary to meet lease obligations, or provide a more equitable take throughout the field. Production control based on open flow volume potentials in a field as large as the Panhandle means that development will proceed to a point where it is not economical to drill further wells. Such a situation exists in the Wheeler County gas field. The conditions existing there today illustrate vividly the folly of attempting to use well potentials to accomplish correlative drainage rights.

Wheeler County Gas Field

A considerable portion of the gas produced in Wheeler County has been purchased in a manner which approaches the well allowable basis, calculated from the open flow capacities of the completed gas wells. Below is a summary showing the pertinent facts concerning the Wheeler County gas field as revealed by data on file at the office of the Railroad Commission of Texas.

Proven sweet gas acreage	151,560
Developed sweet gas acreage	22,080
Undeveloped sweet gas acreage	82,480
Percentage of developed acreage	28
Number of completed gas wells	221
Average open flow per well, cu. ft.	30,000,000
Total developed open flow, cu. ft.	6,630,000,000
Approximate average daily market demand, cu. ft.	50,000,000
Percentage of open flow necessary to supply market demand	.751
Field price paid for gas, per M.	$.02

The method established in Wheeler County for purchasing gas was largely responsible for a drilling program that resulted in overdevelopment of certain areas. Consequently the percentage take on each 1,000,000 feet of open flow is so small that if the production were prorated on a strictly open flow potential basis, it would be economically impossible to drill gas wells which have open flow capacities of less than 20,000,000 feet. Furthermore each new well drilled would add more open flow to the total and reduce the earning capacity of those wells already drilled. Development is now at a standstill and many operators are surrendering leases as soon as they expire or prior to rental dates. Of these abandoned leases, a considerable portion are actual offsets to producing gas leases. Last year 47 leases, comprising 4,370 acres, were surrendered in this manner. An inspection of the leases surrendered shows that the average owner of a leasehold interest could reasonably expect gas wells with initial open flow volumes of 18,000,000 feet per day. It is apparent that due to the conditions under which the Wheeler County gas field was developed, that approximately 30 per cent of the proven gas acreage will drain and confiscate the balance of the proven gas acreage. It is, therefore, apparent that correlative drainage rights cannot be protected by a proration plan based on well potentials but that an unprofitable and senseless drilling program is the usual result of such a policy.

If proration plans are adopted in the West Panhandle gas field which call for unprofitable development before each operator can participate in the market, then the situation existing in Wheeler County will be inevitably duplicated.

Drilling Program

Accompanying table (Table 1) shows the number of wells which can be economically drilled at various takes of gas and various prices paid for gas in the West Panhandle gas field. The number of wells that can be economically drilled varies widely with the price received for the gas and the volume of gas necessary to meet the market demand. During the year 1932, the average daily take of gas by the various gas companies in the West Panhandle gas field amounted to approximately 212,000,000 feet per day. Based on a field price of 4 cents per 1,000 feet and an average initial well investment of $23,000, only 474 profitable wells could be drilled in this field. A development program which calls for many more than this number of wells will make it impossible for numerous owners of proven acreage to develop their properties and participate in the market. Even a spacing of 1,000 acres per well would not allow the profitable drilling of part of the proven available reserve if based on the assumption that all of the proven gas acreage is uniform in productivity. This is not the case as there is a wide difference in the productive ability of gas acreage in this field, depending on its location. It therefore follows that gas leases whose productivity is lower than the average cannot participate in a spacing program based upon average productivity figures. The writers feel that a spacing program which calls for less than 2,560 acres per well will make it economically impossible for the development of all of the proven available reserve, and it seems probable that an even larger unit would be more desirable.

Plan Proposed to Accomplish Equitable Distribution of Gas Production

The writers believe that the following plan would extend to every owner of sweet gas acreage an opportunity to share ratably in the natural gas market of the West Panhandle Field.

1. That the proven gas acreage be graded according to expected open flow and expected rock pressure.
2. That the expected rock pressure times the expected open flow times the number of acres represent the well proration factor.
3. That the sum of the well proration factors will equal the field proration factor.
4. That the well proration factor divided by the field proration factor will equal the percentage participation factor of any well.
5. That the well percentage participation factor times the market demand for gas will equal the well proration allowable.
6. That the proven acreage which can participate through the production of one well shall not be restricted to an amount less than that necessary to allow the economic development of the entire available gas reserve.

There are, at the present time, 317 completed gas wells in the West Panhandle gas field. A study of the physical facts concerning these wells demonstrates the feasibility of grading acreage on an open flow, rock pressure basis. It has been found that the expected rock pressures can be predicted with reasonable certainty throughout the entire field. It has also been found that undrilled gas acreage can be graded as to expected open flow volumes with a reasonable degree of accuracy.

Reserve Factors

Since the equity of ratable taking lies in the theory of correlative drainage rights and drainage applies only to available reserves, it logically follows that proration factors should be based upon available reserve factors. The actual appraisal of the reserves underlying each gas lease depends on facts that are either obscure or when attainable not sufficiently accurate to base a proration program. The factors of expected open flow and expected rock pressures, while not directly indicative of reserves are nevertheless a function of available reserves. Reserve estimates are generally based upon space factors such as porosity and formation thickness, combined with the state of compressibility under which the gas exists. Open flow volumes of gas wells depend probably as much upon permeability as they do upon porosity and pressure, but they offer the best known method of appraising the relative productivity of gas acreage. The writers believe that most of the error which enters into the use of open flow as a proration factor will be compensated by periodic adjustments of the proration schedules as a result of subsequent development.

Advantages of Plan

The advantages of a plan based on expected open flow and expected rock pressure are as follows:

1. The uniform development of the field which would prevent physical waste.
2. The opportunity to all owners of gas leases and royalties to participate ratably in the lawful market for gas.
3. The prevention of an uneconomic and confiscatory drilling campaign.
4. The highest possible profit from the production of gas to both producers and royalty owners.

The size and extent of the West Panhandle gas field is so that if production of gas is left to the law of capture as exemplified by open flow potential or small acreage unit methods of take, the inevitable result will be the ultimate destruction and confiscation of a large percentage of the gas reserve by those who have a lawful market outlet. If unconnected gas leases are not provided with a market, their only other alternative in order to protect their reserves is to process their gas through casinghead gasoline plants and allow the residue to escape to the air. This method of gas utilization would result in untold physical waste.

The writers believe that the only fair allocation of the available market for gas from this field should be based upon ratable drainage rights which take into consideration the available reserves of all owners of gas in the field.

The writers wish to acknowledge their grateful appreciation of help received from Victor Cotner of the Columbian Carbon Co., who criticized this manuscript, and permitted the use of data from his unpublished paper on the Texas Panhandle gas field.

C. H. Kountz Is Chairman of Pipe Line Committee

C. H. Kountz of the Sinclair Prairie Pipe Line Co., Independence, Kans., has been appointed chairman of the newly designated central committee on pipe line transportation of the Division of Production, American Petroleum Institute, according to announcement of Charles F. Roeser, chairman of the general committee.

As a part of its program of activities, the new pipe line committee has set up a Conference Subcommittee on Longitudinal Use of Railroad Property, and G. M. Davidson of the Natural Gas Pipe Line Co. of Chicago has been designated chairman to work with C. R. Musgrave, Phillips Petroleum Co., Bartlesville, Okla.; Harry Moreland, Great Lakes Pipe Line Co., Kansas City, Kans.; T. M. Milling, Standard Pipe Line Co., Inc., New Orleans; C. R. Weidner, Sinclair Prairie Pipe Line Co., Independence, Kans.; and Fayette B. Dow, American Petroleum Institute, Washington, D. C. It will be the function of this subcommittee to co-operate with the subcommittee of the American Gas Association and the A.P.I. subcommittee on railroad transportation.

C. A. Young, secretary of the Division of Production, is secretary of the new Central Committee on Pipe Line Transportation. Members of the committee, in addition to Chairman Kountz, are:

E. L. Adams, General Petroleum Corp. of California, Los Angeles; Clyde Alexander, Phillips Petroleum Co., Bartlesville; W. M. Averill, Pure-Van Pipe Line Co., Beaumont; E. O. Bartlett, Barnsdall Oil Co., Tulsa; R. P. Bascom, Shell Pipe Line Co., St. Louis; Charles Bunje, Jr., Illinois Pipe Line Co., Findlay, Ohio; D. S. Bushnell, Northern Group of Pipe Lines, New York; F. E. Coyle, Associated Oil Co., Wilmington; A. L. Dade, Deep Rock Oil Corp., Tulsa; Fayette B. Dow, American Petroleum Institute, Washington, D. C.; R. S. Ellison, Stanolind Pipe Line Co., Tulsa; Charles Fitzgerald, Sinclair Prairie Pipe Line Co. of Texas, Fort Worth; A. H. B. Gore, Richfield Oil Co., Los Angeles; William Groundwater, Union Oil Co. of California, Los Angeles; George J. Hanks, Tide Water Pipe Co., Ltd., Bradford, Pa.; R. V. Hanrahan, Humble Pipe Line Co., Houston; Fred K. Haskell, Empire Pipe Lines, Bartlesville; R. W. Howe, Atlantic Pipe Line Co., Dallas; B. E. Hull, Texas Pipe Line Co., Houston; E. C. Kincade, Gulf Pipe Line Co., Houston; E. H. Leroux, Oklahoma Pipe Line Co., Muskogee; R. A. Miller, Indiana Pipe Line Co., Huntington; F. Ray McGrew, Standard Pipe Line Co., Shreveport; Harry Moreland, Great Lakes Pipe Line Co., Kansas City; Stuart Moser, Standard Oil Co. of California, San Francisco; R. W. Pack, Sun Pipe Line Co., Beaumont; F. B. Fims, Shell Oil Co., Los Angeles; E. H. Skinner, Continental Pipe Line Co., Ponca City; Allen T. Towl, Southwest Pennsylvania Pipe Lines, New York; D. O. Towl, Imperial Pipe Lines Co., Ltd., Toronto; and C. R. Weidner, Sinclair Prairie Pipe Line Co., Independence, Kans.

Proration as Based Upon Bottom Hole Pressures and Acreage Most Equitable and Practical

By JAMES O. LEWIS and HARRY F. WRIGHT
Consulting Engineers, Tulsa*

The purpose of this paper is to analyze the several methods that have been used or proposed for prorating oil and gas production, and for securing equitable recovery among the property owners of an oil and gas field. It is the conclusion of the writers that a method based upon bottom hole pressures is the most equitable in principle and will be the most practical in application of any so far advanced.

Time has prevented specific references to papers which have previously been published on this subject and credit can not be assigned for origin of the ideas herein.

Correlative Rights and Law of Capture

The principle of correlative rights is old in law but new as applied to oil and gas fields, for only recently has substantial progress been made toward determining equities among the owners of a common source of supply. Because of this lack, the law perforce adopted a special legal concept of ownership in an oil and/or gas pool that has become commonly known as the law of capture. Instead of vesting the ownership of the oil and gas in ownership of the overlying surface as is common in almost all other kinds of mineral deposits, ownership becomes recognized only after the fluid had been captured and was in someone's possession either in his tanks or pipe lines. As a consequence each owner has secured as much as he could, regardless of whether the oil and gas came from beneath his own or his neighbor's property. A property owner was afforded little or no legal protection against the drainage of his supplies from under his land save his protective right to drill for and to produce it. In the case of leaseholds, he was under legal obligation to the royalty owner to offset each well with one at an equal distance from the line, and to produce it at the same rate with the intent of preventing or at least minimizing drainage thus recognizing the principle of ownership in place to the extent that it could be applied in practice.

For many years the law of capture was accepted as a necessary evil. The resulting gross wastes and inequities are a matter of common knowledge. From time to time legal efforts have been made to mitigate these evils and to recognize the correlative rights of the various property owners in a common source of supply. Laws were passed setting a minimum distance for offsets, for protecting the oil and gas sands against waste and damage, and, especially in gas fields, attempts were made to procure equitable takings from the common supply.

In recent years the advance in technical knowledge has disclosed more and more forcefully the magnitude of the evils resulting from the law of capture, and has gone far to point out methods of correction. The principle of unit operation has been advanced and has now been generally accepted in theory as the best solution to the problem, but it has made only slight progress in application. Within the past few years overproduction has led to proration, which has forced attention still more urgently to the need of an acceptable method for equitable taking of oil and gas from fields which are not unitized.

Proration Not Substitute for Unitization

It is the writers' opinion that unitization affords the best solution to the problem. It makes possible the development and operation of a pool so as to permit, under intelligent management, the highest extraction, the greatest economy, the least waste and the most satisfactory control. But it must be recognized that most fields will be operated competitively, and that it is highly desirable to find methods for taking the oil and gas equitably and for establishing and protecting correlative rights among those draining from a common source of supply. It must be kept in mind that proration has two purposes, one to allocate equitably the daily production allowed for a curtailed pool and the other to secure for each property owner his just share of the oil and gas regardless of the market needs. Whether or not there is oversupply of oil and gas there should be equitable taking from the common supply. If it can be firmly established to the satisfaction of the courts that equities can be determined readily and with substantial accuracy it is quite certain that the injustices resulting from the operation of oil and gas pools under the law of capture can be greatly ameliorated.

Principles of Proration by Bottom Hole Pressures

The principle of using bottom hole pressures for establishing equitable taking of oil is predicated upon the equitable use of the energy which forces the oil from the sand into the drill hole. In the predominant number of cases this energy is gas. It must be remembered that only a part of the oil can be recovered and it is only the recoverable portion that is of actual value to the operator, consequently, it is the recoverable portion and not the total amount underground with which we are concerned. The oil is driven through the sand by the gas or water energy, and therefore the control of this energy is control of the causative agent. If a pool is so operated that each lessee is allowed to take from the common source of supply only the energy originally under his property, or an equivalent amount thereof, then he would recover from it only the amount of recoverable oil to which he is entitled because of his surface ownership.

Under the competitive operations of the past an operator favored by natural conditions or by more aggressive and often wasteful tactics, could cause gas to flow toward his wells from properties for some distance around, and could thus drain his neighbors of the vital force necessary for the recovery of the oil. Though possibly not a barrel of his neighbors' oil actually reached his wells, yet the use of more than his share of the energy would cause a greater recovery from his wells and a lesser recovery for his neighbors. The only recourse open to the neighbors was to adopt the same tactics. Thus a premium was placed upon the most wasteful manner of operation which set the pace for the field and caused close and unnecessary drilling with excessive development costs, and waste of gas and recoverable oil.

Proration in a Field With Uniform Sand Conditions

To simplify the explanation of the use of bottom hole pressures for proration, assume a field with uniform sand conditions and uniform spacing of wells all drilled at the same time. In the beginning the same pressure would be found throughout the pool. If one operator was drawing more heavily on his wells—because perhaps, he happened to have a larger market outlet than his neighbor—he would lower the pressure faster, and the oil and gas would flow toward them faster and from a greater radius than it would toward the other wells with higher pressures. If, however, no operator was allowed to lower his pressure below the others, fluid would flow equally toward all the wells and all could have equal daily production and finally equal recovery. Between each two wells the flow would be from the median line, where would be the highest pressure between them.

Effect of Uneven Spacing

Assume next a field with uniform sand conditions but with wells unevenly spaced. Assume a tract of 10 acres with four wells spaced two and one-half acres to the well, surrounded by larger tracts on which the spacing is 10 acres per well. On the small tract, if the wells were spaced on an even pattern, each well would be 165 feet from the boundary line, whereas on the larger tract the wells would be 330 feet from the line, thus the median line for drainage would be 247½ feet from each well and the small lease would drain 82½ feet out of its neighbor's properties on all sides. The total drainage area would be 15½ acres instead of the 10 acres owned even if equal pressures were held on all the wells. However, if the wells were drilled at equal distances to the property lines and equal pressures were held, drainage would be almost confined to each property.

It is doubtful whether there can be devised any practical way of equitably prorating production between adjacent properties where one has wells drilled closer to the line than the other. It will be necessary for the state to maintain regulations for minimum offset distances and for each property owner to protect his interests by drilling at an equal distance to his neighbors.

It might be thought that equitable withdrawals could be gained in such a field simply by prorating on an acreage basis because each acre would contain as much oil as every other acre. But this would not be true with respect to the recoverable portion of the oil that would be influenced by the well spacing and the manner of operating the wells. In most fields that are developed competitively the closer drilled property will recover more oil and such a property would be entitled to a larger allowance per acre.

Effect of Uneven Sand Conditions

Such uniform sand conditions as have been assumed in the foregoing never exist in fact. In all fields there is variation in thickness of sand, and in the porosity and size of pores within the sand body; all of which result in different rates of productivity of the wells and in different ultimate yields per acre. There will also be variations in many other conditions. At the top of the structure the higher parts of the sand may contain free gas, and wells drilled there may yield large volumes of gas but little oil. Around the edges of the pool the lower part of the sand will contain water, and the wells will have small ultimate recovery. In some cases this water will encroach rapidly and flush the oil ahead of it, as was the case at Powell and at Seminole, and as it is now doing in East Texas. In other cases water may be present, but may not encroach.

Assume now a common type of field with irregular sand body, but with no gas cap nor encroaching water. In such a field there will often be wide variations in both daily rate of production and ultimate yield per acre and per well. There will be properties having wells with initial productions of several thousand barrels per day and with ultimate yields up to 20,000 bbls. per acre; and in the same field properties whose wells may have initial capacities of less than 100 bbls. per day and ultimate yields of only 2,000 bbls. per acre. But even though there exists such diversities of sand conditions as to be responsible for these wide differences in flow and yield, the gas pressure in the sand will be uniform throughout when the field is first opened. If the wells were evenly spaced and the pressures were held uniform, the flow toward each well could, on the average, be very closely restricted to equal drainage areas because of irregularities in the sand, the actual drainage areas might not correspond exactly to the property lines, but in most cases encroachment by one's neighbor in one direction would be approximately equalized by encroachment upon another neighbor in another direction. All would have an equal chance, with only small possibility that anyone would be seriously hurt by the uncontrolled variations underground. In the lean parts of the sand, the barrels produced for each pound decrease in pressure would be less than in the rich parts, but these variations would be caused by natural conditions existing under each property, and each owner would be getting what he was entitled to by reason of his ownership.

Applying Proration by Bottom Hole Pressures

To meet the described conditions and others to be mentioned later, the method which the writers believe will prove most equitable and applicable is to prorate according to a factor derived from the ratio between oil recovered and the drop in pressure. It can be determined from experience that for each pound loss in bottom hole pressure certain quantities of oil can be produced from each property in a pool and for the pool as a whole. These factors can be conveniently called the "production-pressure ratios." It could be provided that daily allowables for the pool be set ahead for suitable periods—say 60 days—and from the factor for the pool it will be estimated what will be the drop in pressure. This total allowance would be allocated among the various properties in proportion to their factors. At the end of each period the factor should be redetermined for the ensuing period and in this wise be selfcorrective. The object would be for each property to have an equal pressure drop during each period.

The foregoing is the primary basis for the system and in the following pages the writers endeavor to test it out against the varying types of pools and conditions of development, as well as against other methods of proration that have been applied or proposed.

Establishing Pressure-Production Ratios for Proration Purposes

The "production-pressure ratio" of the various properties would differ widely. In one instance it might be 200 bbls. per pound drop; in another 100 bbls. per pound; and in still another perhaps 25 bbls. per pound. These variations would result partly from varying conditions in the sand, partly from well spacing, and in the case of water-drive fields the production-pressure ratio would probably change with the rate of production for the whole field. The wells in tight, thin sand would have a low production-pressure ratio in comparison with wells in more open sand. A well draining 5 acres would have a

*Before Mid-Continent District meeting A.P.I. Division of Production, Wichita, Kansas.

lower ratio than one in equally rich sand but draining from 10 acres. These ratios would not be arbitrary—except possibly at the very start—but would be the result of the various conditions affecting each property as determined by actual experience. They would be determined from a series of tests under conditions where the wells would be produced so as to keep uniform bottom hole pressures.

These ratios would not be available when the field was first opened up. In order to make a start it is suggested that the allowables first be set in proportion to a factor determined by multiplying the initial flows or potentials by the proved acreage. At the end of the first period for correction it will be found that the different wells or leases—whichever is established as the unit for proration purposes—will have shown different declines in pressure and different production-pressure ratios. From this experience, adjustments for the next period can be designed to equalize the pressure by cutting down the production where the pressure drop has been greater than the average and increasing it where the pressure decline has been less than the average. At each succeeding period similar corrections can be applied in accordance with the experience of the period just closed, so that the method will become self-corrective.

An Example

As an example, property "A" of 160 acres all proved and having 10 wells thereon produced 60,000 bbls. during the period, and the pressure declined from 1,600 pounds to 1,540 pounds, a loss of 60 pounds. Property "B" of 40 acres and 5 wells produced 24,000 bbls. of oil, and showed a drop in pressure from 1,600 pounds to 1,520 pounds, a loss of 80 pounds. "A" had a ratio of 1,000 bbls. per pound for the whole property or an average of 62½ bbls. per acre. "B" had a ratio of 300 bbls. per pound for the whole property or 75 bbls. per acre. To maintain the predetermined field allowable for the next correction period, from the average of all the properties during the one just closed, it is determined that during the ensuing period the pressure shall be allowed to fall to 1,450 pounds. Property "A" would be allowed a loss of 90 pounds to 1,450 pounds, and multiplied by its production-pressure ratio of 1,000 bbls. per pound, a total production of 90,000 bbls., or 1,500 bbls. daily. Property "B" would be allocated 70 pounds, which multiplied by its production-pressure ratio of 300 bbls. per pound would give a total of only 21,000 bbls., or 350 bbls. daily. In practice it should seldom be necessary to have so great a discrepancy between prediction and performance, nor to make such a drastic correction, but this example will illustrate the principle.

It will be seen that in practice a new daily allowable would be set at stated periods; first, the allowable for the field, and secondly, its allocation among properties or wells. Each operator's total production for the period would be fixed in accordance with the experience of the one just finished. He might be allowed to take this amount at an average rate per day, or in accordance with whatever plan might be most suitable for the conditions involved.

Would Reduce Illegal Oil

Such a plan would expedite the work of such agency as might be charged with the supervision of production and largely reduce the opportunities for producing considerable quantities of illegal oil. The production of any considerable amount of illicit oil would result in excessive loss in pressure. During the ensuing period that operator's pressure allowable would be less and his ratio less, thus severely cutting down his allowable. Whether or not his illicit runs were ever detected directly it is certain that the finger of suspicion would be pointed toward him, and in a short time he would be faced with vanishing allowable that would make it impossible for him to continue overproducing.

Suppose an operator was allowed 30,000 bbls. and 100 pounds pressure decline, and that he took illicitly an additional 15,000 bbls. His pressure drop would then be abont 150 pounds, or 50 pounds below his neighbors who had operated their properties legally. At once operator "B" would be under suspicion, and during the next period his runs would be 30,000 bbls. (the official runs) divided by 150 pounds, equals 200 bbls. per pound instead of 300 bbls., and his total allowable only 10,000 bbls. for the period instead of the 30,000 bbls. to which he would have been entitled had he run only legal oil. It is obvious that the sins of the illegal operator would soon find him out. By being held down in his allowable for the second period to 10,000 bbls. his total recovery for the two periods, both legal and illegal together, would be 55,000 bbls., whereas he could have taken 60,000 bbls. had be observed the rules. This selfdetecting and correcting feature would work out particularly in fields with gas as the principal expulsive agent, but even in loose sand fields like East Texas it would operate to greatly reduce the opportunities for illegal running of oil.

Fields With Gas Caps

Suppose we next consider a field having a gas cap, i.e., one in which the highest part of the structure contains only free gas. Next lower will be a belt in which the upper part of the sand contains gas and the lower part oil, and surrounding this a zone in which the sand is saturated with oil from top to bottom. Such fields were Cushing, Cromwell, Blackwell, Teapot Dome and a number of others. In the past, the operators in the upper, gassy parts of the field would blow off the gas in order to lower the pressure and draw in the oil. The result was the waste of tremendous quantities of gas with its expulsive force and recoverable oil was drawn into the dry sand thus lessening the recovery of the field as a whole. Under the law of capture, the efforts of owners of gassy properties to draw oil into the wells by blowing off the gas has resulted in extensive and shameful waste of natural resources.

In principle in such a field the gassy parts should not be produced at all. The gas should be left to force its way through the oil saturated sand and carry the oil to wells farther down the slope of the fold. In this way the free gas would act as an additional expulsive agent and would increase rather than decrease the total recovery of oil. By returning the unmarketable surplus of gas to the high parts of the sand, the gas would be conserved until a market was developed, and the recovery of oil still further increased by thus maintaining pressure in the sand. But, however equitably the common supplies of oil and gas may be divided among competitive operators, the full benefits of economy in development and operation, and the greatest utilization of the oil and gas, in such a field could only be realized through unit operation.

In the assumed case of a gas cap field, operated competitively, proration would be applied in the same manner, regardless of whether the properties were underlain by free gas only, free gas and oil, or oil with gas held in solution. A uniform pressure would be held on the sand, and the oil would have little if any tendency to migrate away from those properties with oil saturated sands only, nor gas migrate from the free gas areas to the oil areas. The property with gas only would produce gas only, and it could only be withdrawn in accordance with the same rate of pressure decline as was common for the whole field. Such a property would have to operate as a gas property and get its revenue from the sale of gas. A property whose sand was saturated partly with free gas and partly with oil would have wells producing much gas and varying quantities of oil, and it would have an oil pressure ratio established by experience the same as the oil saturated properties but its income would come from the sale of both oil and gas.

It cannot be expected that in practice an operator in the gassy part of the field would be satisfied with such an arrangement; but under the principle that an operator is entitled only to that which underlies his property he would get only what was his, and no more and no less. It would be his misfortune that he had purchased a property in a less favorable part of the field; but he should no more expect his neighbors to share his misfortune than if he had suffered the greater ill luck of having an entirely barren property completely off the structure. The owner of gas would be restricted in the rate at which he could withdraw it, and perhaps hindered in his sales; but like every other operator in the pool his freedom of action must be curbed to the extent of protecting collateral rights in the common source of supply. We prevent by law the wanton extraction of gas from pools which contain gas only, and there is no valid reason why we should not likewise prevent unrestricted production from the gassy areas of oil pools. Only a pooling of collateral rights into one common interest, through some plan of unit operation, can alleviate the vexations and the expensive balancing of withdrawal rights. So long as the operators prefer individual initiative and freedom of action, just so long must they accept the lesser benefits of producing from a common source of supply.

Water Drive Fields

Another type of field to be considered is that with free water encroachment or natural flooding. Nearly all oil pools are surrounded by water, but in only a minor number of them does the water advance with the depletion of pressure and flood the oil ahead to the higher parts of the reservoir. However, it happens that the pools now giving most concern in proration are subject to natural flooding. In the past, rapid withdrawals usually depleted the pool of its oil faster than the water followed, and the wells at the edge of the pool pumped out the water about as fast as it could encroach. Thus a balance would be reached and maintained until the edge wells could no longer be pumped economically, and must be abandoned. The excess water would then be handled by the wells further in, and so on until finally the whole field would be flooded and abandoned. The advance of water was not orderly, but was irregular in the same degree that both natural conditions and the manner of operation were irregular, and there was a consequent loss of recoverable oil.

Under restricted production in a field subject to effective natural water flood, as in East Texas, the water advance can be made slower, more regular and more effective in washing the sand by regulating withdrawals of oil and gas so as to, maintain a uniform pressure front against the water. Equitable takings can be worked out under bottom hole pressure control the same as in other fields.

As the pressure in the reservoir is reduced by the withdrawal of oil and gas, the oil body tends to move ahead of the water from the low edges of the field toward the higher parts. Under a plan of restricted operation which requires or permits the same daily production from each well, the higher properties are favored at the expense of the outer or water edge properties. Unless the edge leases are permitted to produce their oil before the water flood reaches them, the oil will have been pushed onward into the higher parts of the field and lost to the original owners.

With the production plan based on bottom hole pressures, withdrawals can be kept far more equitable than on equal allowances per well or per acre. Where water drive exists, it is because the pressure on the field is induced by the hydraulic head of the surrounding water. As the oil and gas contents of the sand are removed through the wells, with resultant local loss of pressure, water moves forward under the impulse of greater pressure from the surrounding area. Thus the edge properties maintain their pressures at a higher level than the inside ones because the pressure drop occasioned by withdrawal of oil and gas is partly restored through replacement by water. Such properties would show a higher production pressure ratio and would have a shorter life, but they would get greater allowables than the interior properties once the field had been depleted to the point where water encroachment became effective. The edge operator would thus have the best chance of getting his share of the oil.

Fields With Several Producing Horizons

There remains to be considered the field with several different producing horizons which are separate from each other. Under such conditions each horizon should be considered as a separate field, and each should be prorated separately. This will require the restriction that no two horizons may be produced simultaneously from the same well, but in no other way can adequate control be exercised.

Reasonable Reward for Enterprise and Efficiency Under Proration

Thus far, "correlative rights" and "equitable takings" from the common source of supply have been predicated solely upon rights set up in the ownership of the recoverable oil originally underlying each tract; and in the premise that each operator is entitled to that amount either in kind or in equivalent value. But it is a principle recognized both in law and common justice that an owner must exercise and protect his rights, else they lapse. This principle may easily be followed by providing that no production allowance be made for tracts which are not proved by at least one well to some unit of acreage—such as 40 acres—appropriate to the field in question. It might be argued that the equities in the common source of supply should also take into account the relative enterprise and investment in wells in the pool—that the operator with say, nine wells on a "40" should be entitled to proportionately more oil than another with only four wells on a "40."

There are two aspects to this question. One is whether greater enterprise and investment entitles one to draw not only on the supply under his property, but also from adjoining properties if his neighbors had not been equally enterprising or fortunate. Followed logically, this principle would return us squarely back to the law of capture and all of the evils thereof. It forces every operator to the same overdevelopment as his neighbor, regardless of his own needs or opinions. Applied to other real estate, it would be like the owner of a lot who had built unwisely upon it wanting to draw upon the adjacent lot owners to share and reduce his losses. It would mean simply a flat allowable for each well regardless of acreage or underground reserves. The owner of the nine wells would produce in the ratio of 9 to 4, whatever might have been the original reserves of the two tracts and, the owner of a tract with only 5 feet of good sand would have the same allowance and the same ultimate recovery as the owner of another tract with 50 feet.

Natural Recovery

The other aspect is that the recoverable portion of the oil reserve is not a fixed quantity, but is dependent in large part upon the manner or development and operation, i.e., the enterprise, investment and judgment of the operator; and that therefore he is entitled to a greater recovery per acre if he desires to take full advantage of his opportunities. It has been established by theory and experience that natural recovery per acre is approximately in inverse proportion to the spacing of the wells, in a field operated as it has been in the past, assuming also a field not subject to rapid water encroachment. Where wells on Property A are drilled 330 feet apart, or 2½ acres per well; and on Property B, 660 feet apart, or 10 acres per well; A will recover approximately twice as much oil per acre as will B. On the other hand, A will have twice as many wells as B, and his recovery per well will be only half that of B.

Well Spacing

Economically, well spacing should be decided principally upon whether the additional recovery per acre resulting from close spacing will show an adequate profit on the greater number of wells required. This involves some indeterminate factors, including the future price of oil. There will therefore be differences of

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opinion among neighbors. If one wishes to drill closely, that should be his privilege; to the extent that his neighbor is not forced to do likewise in mere protection of his property. The law and common justice recognize that an individual should have much latitude in doing things whose unfavorable effects will fall only upon himself; but that he should be curbed when his mistakes might cause distress or damage to his neighbors. There are reasons why it is to the public interest that wells should not be drilled too closely, so there should be a minimum as well as a maximum limitation to well spacing.

Under a plan of proration based upon pressure, the operator with closely spaced wells would get the additional per acre recovery to which he is entitled, and perhaps just a little more; although not enough to seriously hurt his neighbor or to necessitate the same close drilling for protection. The greater recovery per acre would show up in his production-pressure ratio. His allowable per well would be less, but his allowable per acre would be more, than for tracts not drilled so closely. A minimum distance for locations against property lines, in conjunction with control by pressure and acreage, will protect contiguous properties not so closely drilled. The exceptions to this will be the very small or oddly shaped pieces, and in these instances the resulting excessive drainage will be small and localized. Moreover, such a plan would discourage the deliberate creation of small subdivisions, whereas proration on a per well or potential basis puts a premium upon it. In the interests of justice it is not too much to expect that our states will prohibit the subdivision of leases below a minimum size.

Proration by Pressure Gradients

The discussion of proration by pressure has so far assumed the carrying of equal pressures throughout the field. But in practice, drilling after discovery spreads irregularly, and often it is several years before all the limits of the field are found and all parts of it developed. Obviously, the first developed parts should not be held to the high pressures of the newer parts, for to follow literally the principle of uniform pressures would require that all the wells be held in until the last one had been drilled. In practice it will be necessary to adopt pressure gradients for control of the field rather than to maintain a uniform pressure throughout. Irregularity of development will result in local high and low pressure areas in accordance with centers of earlier and later drilling. It must be borne in mind, too, that this article is written from the standpoint of applying the system to new fields. For fields that have been developed under another proration system, it will be more difficult to change to a different system such as is proposed.

In considering this problem it should be kept in mind that a difference in pressure of say, 50 pounds, is unimportant where the wells are a mile or so apart, but is very important if they are on adjoining locations. The concern should be more toward keeping down local differences than in adjusting variations at wider distance. There also arises the question, to what extent shall the operator who drills ahead and proves up new parts of the field be rewarded for risks he has taken, and for the service he has rendered other operators whose properties he has proven without risk or cost to themselves. In the past, such enterprise has been rewarded by the oil drained from surrounding properties while the offsets were being drilled. It was the usual experience that such a well created a large drainage area extending to adjacent properties, which was never entirely recaptured by the later offset wells.

Under the proposed bottom hole pressure system the well drilled in advance would be rewarded by getting its oil to market sooner, and by having a much higher pressure-production factor. At first it would be drawing from a large area, which advantage would continue at a decreasing rate for some time after the offset wells were completed. Ultimately the early well would show a higher recovery than those drilled later. The proposed plan would not protect the dilatory operator, but would require him to complete his offset wells at substantially the same time as his neighbors.

It is believed that the fairest and most practical way of handling the problem would be to fix the allowable for each well as it is completed, based upon the same pressure drop and upon a production-pressure ratio derived as outlined previously. As later wells are completed they should be allowed larger pressure drops, designed to permit them, within a relatively short time, to catch up and equalize with the lower pressure of the first well. In a large field it might be necessary to establish a graduated scale from the lowest pressure areas to the highest ones, but these differences would be ironed out in the course of time to bring the field to a common level of pressure. Eventually the field would pass out of the prorated class as its capacity declined.

The result of this proposal would be to reward the pioneer by allowing some drainage of his neighbors but to restrict it below what has happened heretofore in competitive fields. Should it be held that even under such circumstances, the pioneer well was not to drain the neighbors, it could only be accomplished by shutting it in until the offset wells had been completed.

Comparison With Other Proration Systems

It has been shown that proration upon acreage alone, upon a flat well basis or upon a combination of the two will be inequitable and will lead to many abuses. Other methods which have been suggested are: Well "potentials," gas-oil ratios and time.

Where proration is based upon the "potential" capacity of a well to produce, the potentials are obtained by occasionally opening the well for a short period of flow. Allowable production is assigned to each well regardless of the amount of acreage or other factors involved. Usually the result has been overdrilling and needless drilling in advance of the demand for oil, with a consequent waste of capital resources. It has also allowed the overdrilled property with small acreage per well to drain oil from the surrounding tracts.

Recovery per acre is by no means proportional to the daily rate of production of the wells. It can readily be demonstrated that one well with a daily open flow five times that of another well, will not, because of the fact, recover five times as much oil either per acre or per well. Potentials taken in this manner can readily be influenced by the manner of operation. The wells are "rested up" and otherwise prepared to make a big showing during the short test period, and they are frequently rated far beyond their true capacity. There have been numerous instances of properties prorated at a fraction of their potentials that were actually unable to produce as much as their full allowables for more than a few days. High potentials also create fictitious figures for the capacities of fields, which react unfavorably upon the market.

Proration by a combination of potentials and acreage has been used in several fields. Employment of the two factors together lessens the inequities and evils inherent in each. These, however, are still too large to provide a satisfactory system, and it does not get away from the objections to potentials. The method has been used in the Yates and Hobbs Fields, and appears to be the most satisfactory of any so far applied.

It has been suggested that gas-oil ratios be embodied in a proration system. While these ratios are controllable in part by the manner of operation, they are still more the result of natural and uncontrollable conditions in the reservoir. For example, the operator in the gassy part of the field must be allowed a higher gas-oil ratio if he is to recover the oil underlying his acreage. In similar manner, a tight sand property is likely to have an unavoidably higher ratio than a loose sand property. While control of gas-oil ratios so far as practical is in the interests of conservation, it would often be opposed to equitable withdrawals. In this as in many other aspects, equitable withdrawals in a competitive pool do not coincide with conservation.

Thickness, porosity, permeability and saturation of the sands, and other factors indicative of the productive capacities of properties have been proposed for proration purposes. These natural factors are not the only ones influencing recovery, and the difficulties of ascertaining, interpreting, checking and applying them are self-evident. Furthermore, their influence on the recoverable reserves, together with other factors, such as well spacing, will be reflected in the proposed method as discussed elsewhere.

Conclusions

The several methods so far used for determining equitable withdrawals from a competitive pool; including a flat well allowable, potentials, acreage, or any combination of them, all embody inherent and unavoidable inequities and lead to wastes and abuses. Other systems proposed, including oil-gas ratios, time, or sand conditions are inequitable in principle or impractical of application.

The writers believe that a system of proration based upon bottom hole pressures and production is equitable in principle and will be practical and substantially just in application. By controlling pressure in a pool, control is exercised over the causative agent for the recovery of the oil from the common source of supply. The system embodies a factor called the production-pressure ratio, which is determined for each property from the relation between the drop in pressure during a given time period and the amount of oil produced during the same period. The system is self-corrective for both unintentional errors and for illegal runs, and it is believed that it would greatly restrict the opportunities for proration evasion and will have a tendency to indicate the overproduced wells. Two factors are employed: Bottom hole pressure, which is rapidly obtained and readily checked; and production, which is readily obtained and which is self-corrective in later periods if misrepresented.

In the foregoing description of the method it has not been possible to detail all the conditions that may be encountered in application, nor the precise procedures for meeting them. Like every other system it must be worked out from experience, and for practical reasons it may differ in detail as applied to different fields.

Proper Diameter Pump For the Oil Well Use

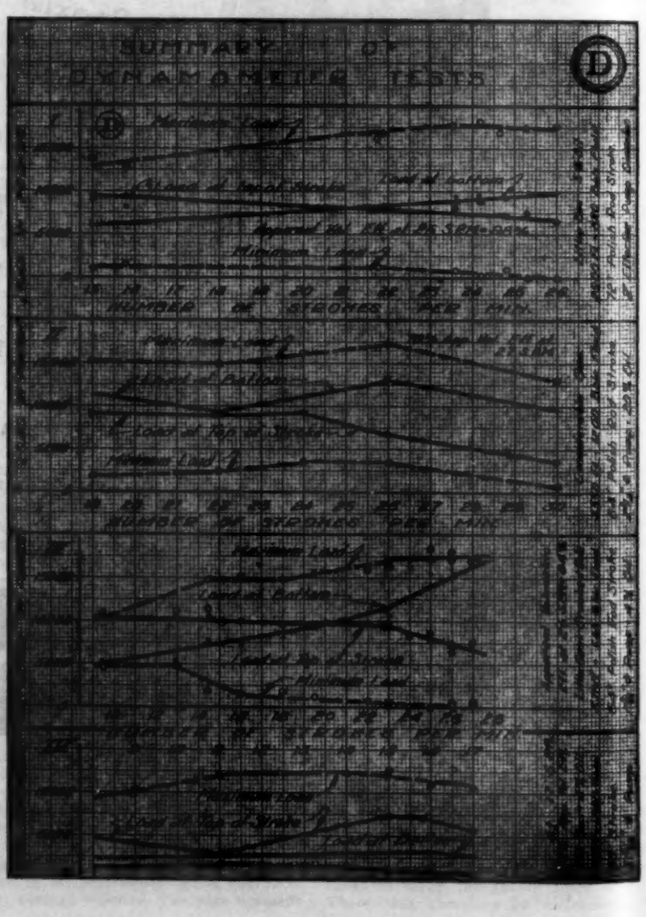
(Continued from Page 41)

in the choice of the correct pump diameter than the others, and that when this care is given better pump efficiencies are obtained, or an increased amount of fluid is recovered with less effort.

OIL WELL PUMP DISPLACEMENT TABLE

Diameter of plunger (Inches)		Area of plunger (sq. in.)	F	f
1	1.000	0.785	0.117	0.00344
1 1/8	1.125	0.994	0.148	0.00436
1 3/16	1.188	1.106	0.164	0.00479
1 1/4	1.250	1.227	0.182	0.00531
1 3/8	1.375	1.485	0.220	0.00643
1 1/2	1.500	1.767	0.262	0.00765
1 5/8	1.625	2.074	0.308	0.00898
1 3/4	1.750	2.405	0.357	0.0104
1 25/32	1.781	2.492	0.370	0.0108
1 15/16	1.938	2.948	0.437	0.0128
2	2.000	3.142	0.466	0.0136
2 1/8	2.125	3.547	0.526	0.0154
2 1/4	2.250	3.977	0.590	0.0172
2 3/8	2.375	4.430	0.657	0.0192
2 7/16	2.437	4.666	0.692	0.0202
2 1/2	2.500	4.910	0.729	0.0213
2 3/4	2.750	5.941	0.883	0.0257
3 3/4	3.750	11.05	1.640	0.0479

Displacement=SPM×L×F (bbls. per 24 hrs.)
=SPM×L×f (gal. per min.)
SPM=Number of pump strokes per min.
L=Length stroke in inches.
F=Constant
$$= \frac{\text{Cu. in. per in. stroke} \times 60 \times 24}{231 \times 42}$$
f=Constant
$$= \frac{\text{Cu. in. per in. stroke}}{231}$$



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- BELTING
- BOILERS
- *CABLE DRILLING TOOLS
- *ENGINES (INTERNAL COMBUSTION)
- *FISHTAIL BITS
- *GRIEF STEMS
- *HOOKS
- *JARS
- *LINE SHAFTS (ROTARY DRILLING)
- *POLISHED RODS
- *PULL RODS
- *REDUCTION GEAR UNITS
- *RIG IRONS
- *ROPE SOCKETS
- *ROTARY CHAIN
- *ROTARY TOOL JOINTS
- *ROTARY DRILL COLLARS
- *ROTARY SWIVEL CONNECTIONS
- *SHEAVES
- STEEL TANKS
- *STUFFING BOXES
- *SUCKER RODS
- *TUBULAR GOODS
- WIRE ROPE
- *WORKING BARRELS
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Deep Well in Oklahoma City Brought In Through Tubing by Application of New Method

By L. G. E. BIGNELL
Petroleum Engineering Editor

It has not been long since activities at Seminole, Okla., were at their height and air-gas lift plants were being installed in large numbers. This method of producing oil had its greatest development during this period and many problems connected with its adaptation to oil wells were solved then. The original plants used compressed air but later gas was used. The changes necessary to adapt gas to this work were slowly worked out. It is now common practice to use natural gas for the production of oil by the lift method and recently there has been a further expansion of its use to include the bringing in of new wells.

In the Oklahoma City Field there have been many methods used to complete rotary drilled wells, including bailing, swabbing and washing of rotary mud out of the hole. As bottom-hole pressures have been reduced because of large quantities of oil and gas being withdrawn from the various reservoirs in the field special oil has been used instead of wash water. This method was described in an article in the July 7, 1932, issue of The Oil and Gas Journal, page 14.

Due to the reduced bottom hole pressure in the Wilcox sand and the increased gas-oil ratio of these wells it is now proposed by the Oklahoma Corporation Commission that wells should be tubed and produced under back pressure to conserve gas and control water movement as much as possible. While this order has not been rigidly enforced as yet, it is anticipated that the commission will require operators to tube their wells soon in hopes that a portion of the gas now being wasted can be conserved. In a recent test of 15 wells in the Wilcox zone it was found that they were making a combined output of about 425,000,000 feet of gas. It has long been felt that by tubing the wells this gas-oil ratio will be materially reduced and the gas thus conserved be used to assist in producing additional oil.

In view of this changing condition the Sentinel Oil Co. in completing its No. 1 Rodesney in the Wilcox sand in NW SE Section 22-11-3, upon the recommendation of its superintendent, John L. Smith, formerly with the gas division of the Oklahoma Corporation Commission, decided to bring the well in with tubing in the hole and P. & T. kickoff units to control the flow of gas into the annular space between tubing and casing.

The well was completed with a string of 6⅝-inch casing set and cemented at about 6,370 feet and a flow string of 2½-inch tubing of about the same length fitted with P. & T. kickoff units of the two-way type placed every 300 feet up the tubing from the bottom with the top unit 970 feet from the top of the hole. This tubing was connected with a gas line strung from an adjacent well located about 300 feet away, having a casinghead pressure of about 1,300 pounds per square inch. This was the only compressed gas used in the subsequent operations and the highest pressure built up within the tubing at any time during the clean-out period was 950 pounds.

Hole Full of Mud and Water

As is usually the case, the hole was full of rotary mud after drilling below the bottom of the 6⅝-inch casing and in order to permit the oil and gas in the Wilcox sand to flow into the well and to the surface it was necessary to remove this mud fluid. It might have been bailed or swabbed out of the hole until the weight of the fluid column in the hole was less than the bottom hole or rock pressure. This differential in pressure in favor of the producing formation would permit the gas and oil to mix with the mud and so lighten the column that it would be blown out of the well.

To wash the well in with water the same general principles are followed, except that the mud fluid column is lightened to below rock pressure by adding water and washing out mud from the hole until the gas will blow out the remaining portion and clear the flow string for the gas and oil production.

Special oil that will not gas cut can be substituted for water in the washing in process, but with any of the above methods it usually follows that a considerable amount of gas is blown to the atmosphere before the clear oil is produced.

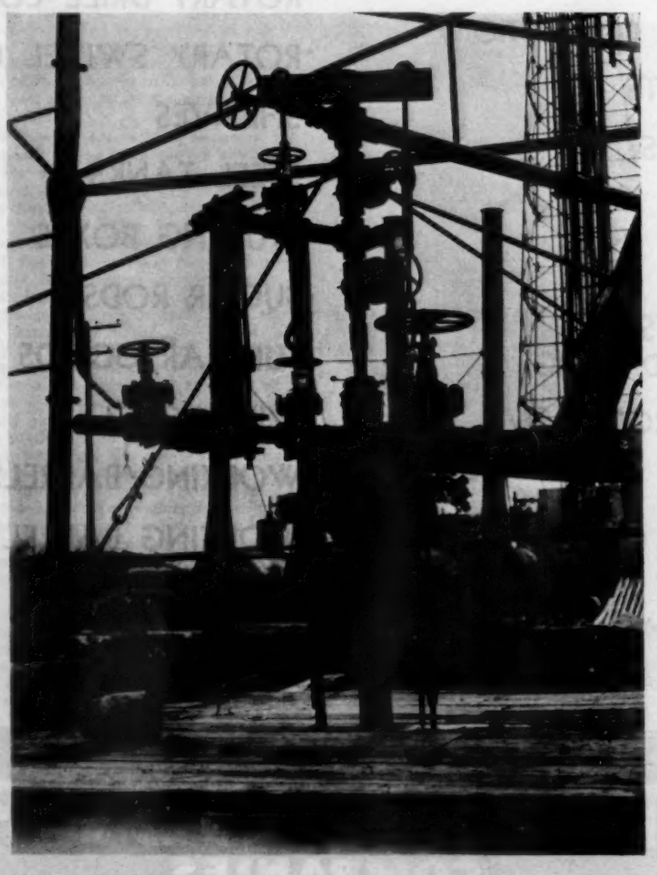
With the use of a string of tubing and the kickoff units it was possible to introduce gas at a controlled rate into the tubing and permit it to force the mud inside the tubing down and out of the upper kickoff couplings and the fluid column in the annular space between tubing and casing, lightened by gas cutting, part of it finally blew out of the hole. The top of the mud column was within about 700 feet of the top of the casing and with the kickoff units spaced 300 feet apart from 970 feet to the bottom of the tubing string the hole was in effect cut up into a number of 300-foot wells.

The pressure built up within the tubing at the time the first of the mud was cleaned from the well was only about 375 pounds per square inch. The spring that holds the valves against the seat in the kickoff unit is designed to exert a pressure of 140 pounds. The double seated valve is held in a neutral position when the tubing is run in the hole because there is an equal column of mud fluid inside and outside of the tubing.

As the gas under pressure is admitted into the tubing the mud inside the string is gradually forced down and escapes through the upper valves into the space between tubing and casing. When the internal pressure in the tubing exceeded 140 pounds the upper valve closed and the gas pressure was conducted on to the still lower kickoff units until in time the whole tubing string is filled with gas and the mud has been forced out of the hole. In this way the distance through which it is necessary to lift the mud fluid gradually increases but the weight of the remaining mud column is lowered until the rock pressure from the producing formation will be sufficient to clear the well of the balance of the mud.

This same method could be applied to bringing in the well if the hole were filled with water or special oil. To clear the Sentinel Oil Co.'s well of driling mud required about 15 minutes and the gas was admitted at the rate of about 186 feet per minute. Less than 3,000 feet of gas was needed for this work, which is considerably less than would have been required had the kickoff units not been used.

The mud fluid had a weight of about 10 pounds per gallon and a specific gravity of 1.2. This would make the weight of the fluid column about 51.6 pounds per hundred feet or 155 pounds for that portion of it between the kickoff units spaced 300 feet apart.



Surface connections on Sentinel Oil Co.'s No. 1 Rodesney well in the Oklahoma City field used in bringing in well through tubing

Hookup at Well Head

While this describes the method followed in clearing the hole of its mud, there were a number of things to be done to prepare the well for the application of this method. Drilling and casing methods were the same as followed in all rotary wells. After the hole had been drilled as far into the producing formation as necessary the hole was left full of mud to control the pressure exerted by the oil and gas. To tube the well with this mud in the hole also presented a problem.

It was necessary at all times to have the well so protected at the casinghead as to insure complete control of the oil and gas under the existing formation pressure, or about 1,800 pounds per square inch. If the well had blown the mud out of the hole as the tubing was being lowered into the hole it would have created a dangerous situation.

It was therefore necessary to use a Cameron Iron Works Co.'s combination ram and seal on the casing. This unit was screwed to the top of the 6⅝-inch casing and the rams were shaped and finished to make a tight fit around the outside of 2½-inch tubing when they were closed. The upper part of this unit is provided with a fitting to accommodate a set of slips by means of which the string of tubing was later suspended in the well.

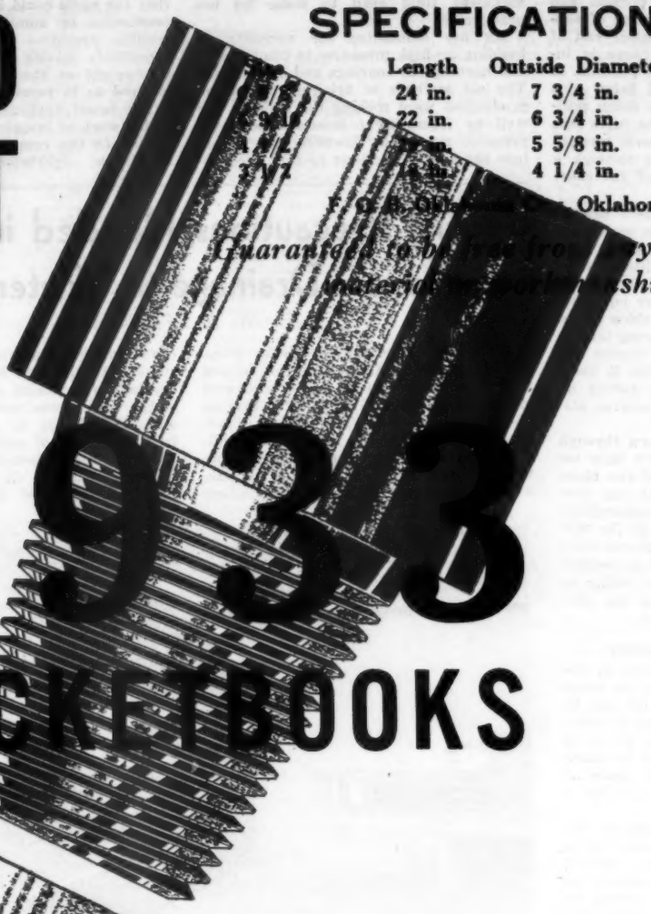
Above this ram and seal a joint of casing is used to form a lubricator to permit the passage of the tubing and kickoff units without opening up the well to the atmosphere during the tubing operation. The upper part of this section of casing is fitted with a second Cameron Iron Works Co. tubing control head and during the tubing operations this upper unit carries the tubing slips. Later they are transferred to the lower or permanent unit.

The tubing is handled in the usual way that has been developed for running a string into wells under pressure and a joint at a time is screwed to the string in the hole and lowered to pass through the lubricator with the well closed against outside atmosphere. The usual type of collars or couplings are used on every joint of tubing except at the 300-foot intervals where the P. & T. kickoff units are placed. To pass these units only requires that the rams be opened wider than for the regular couplings and no trouble was experienced in this detail.

To secure the most efficient gas-oil ratio in flowing the well through the tubing it has been found that it is often necessary to raise or lower the string until the position of the bottom of the tubing is the one most desirable to give the best production results.

To do this the Cameron Iron Works Co. in conjunction with C. O. Moss, engineer for the Deep Rock Oil Co., Drum-

PRICED TO FIT



SPECIFICATIONS

Length	Outside Diameter	Price
24 in.	7 3/4 in.	$22.00
22 in.	6 3/4 in.	17.00
[illegible] in.	5 5/8 in.	16.00
[illegible] in.	4 1/4 in.	12.50

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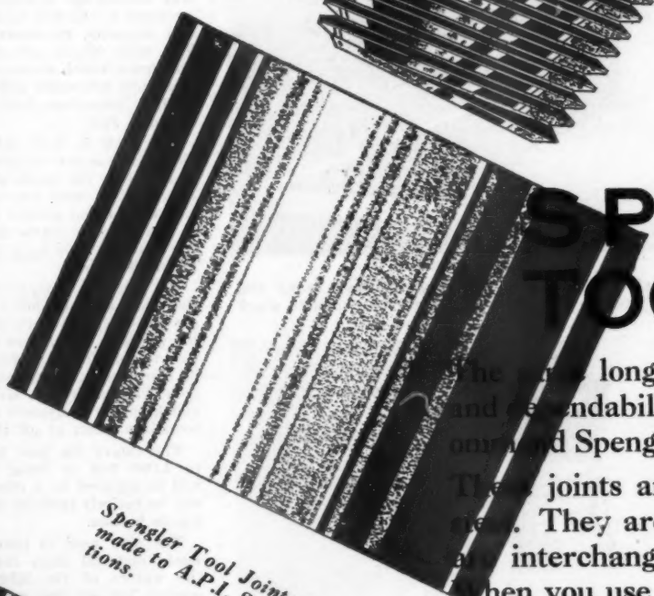

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GENERAL OFFICES AND PLANT: OKLAHOMA CITY

right, Okla., has designed special fittings to be placed at the bottom of the tubing.

These fittings consist of a piece of tubing about 3 feet long, perforated through about 2 feet of the upper portion and attached to the end of the string of tubing by a coupling. At the upper end of this short piece of tubing there is inserted a valve seat in reverse position. A free moving valve is placed below this valve seat also in an upside down position and it is held against the valve seat by a length of rod that extends upward inside the tubing and passes through a stuffing box in the bottom of the short section of tubing.

As long as the valve is held against its seat no fluid or gas can enter the bottom of the string of tubing. To keep this valve in this closed position as the tubing is being run into the hole the rod is fitted at the extreme lower end with spring clips that engage the sides of the casing and by friction and spring tension push the rod upward. This carries the valve up to its seat and holds it there until released by picking the tubing up about 3 feet while the rod remains stationary.

When the rod is pulled down through its stuffing box the free valve falls below the perforated portion of the short piece of tubing and oil or gas can flow into the string through these perforations.

By this bottom connection on the tubing and using two sets of Cameron units (ram type) at the well head it is possible to raise or lower the string of tubing as desired until the best position for efficient flow has been established.

Tubing Wells Under Pressure

From all indications the wells in the Oklahoma City Field will soon be tubed to conserve gas. This tubing job can be done by first killing the the well by loading the hole with mud, oil or water or it can be tubed under pressure by much the same method as described above as used in tubing Sentinel Oil Co.'s No. 1 Rodeaney.

The valve used at the bottom of the string of tubing is very necessary when a string of tubing is to be run against well pressure. Otherwise the gas and oil would be flowing through the tubing as it was lowered into the hole and trouble would result. With the two sets of Cameron Iron Works Co.'s rams at the well head used to pass couplings into the hole and the bottom valve closed no trouble has been experienced in doing this work in several wells in the Oklahoma City Field that have already been tubed with this equipment.

The use of the kickoff units in tubed wells has long been recognized as advantageous and since this system was first introduced in Seminole it has been applied to wells in many other Mid-Continent pools and in California.

The kickoff units are made in three styles, the one-way internal type, one-way external type and two-way internal and external type. These classifications indicate the direction of flow of the gas through the valve; that is, from inside the tubing into the annular space between tubing and casing or in the reverse direction. The two-way valve will permit flow in either direction until such time as either the external or internal pressure is highest and will close the valve against the higher pressure inside.

The valve, seat and spring are all of monel metal to resist corrosion and are so designed as to leave a full-size opening in the units so that bottom hole pressure instruments or other tools can be run through the tubing freely.

To determine the spacing of the kickoff units it has been the usual practice to first find the fluid level in the well and then set the upper unit about 300 feet below this point with the other units spaced at 300-foot intervals to the bottom of the string. By this method the valves are all closed from the inside after the flow has started from the well because the internal pressure in the tubing exceeds the pressure existing between tubing and casing.

The P. & T. kickoff unit has been developed by Price-Trawick, Inc., Stroud, Okla. Fred Price and L. M. (Tiny) Trawick form this company and have developed this unit by the combination of theory and practical demonstrations and have so perfected it that it is now applicable to any well in which there is sufficient fluid head to make its use practicable.

Its use eliminates the necessity of building up high pressures in compressors and burning out bearings and other parts. The old methods of bringing a well on production were rocking the fluid in the well by intermittent injections of high pressure gas or by lowering the tubing into the hole in sections so that the submergency was never too great to prevent the well from producing as the tubing was being lowered. This method was never very satisfactory and it was finally found that the wells could be placed on gas lift production by admitting gas under reasonable pressures at a slow rate and thoroughly mixing it with the oil until the weight of the fluid column was so lowered as to permit the well to flow.

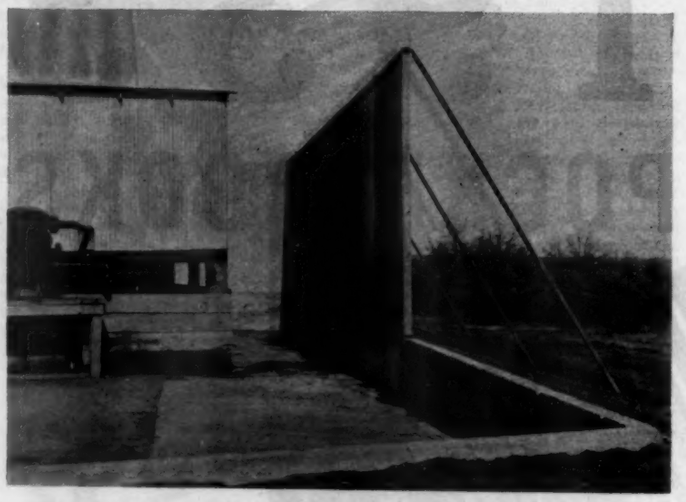
The latest application of kickoff units to the work of bringing in a well is largely due to the combined efforts of John L. Smith, superintendent, Sentinel Oil Co., who has long advocated gas conservation in the Oklahoma City Field and finally secured the approval of Harold Davis, owner of this property, to adapt this process to bringing in their first Wilcox well in Section 22 as above described. Mr. Smith was assisted in working out the details of the process by L. M. Trawick, Price-Trawick, Inc., and Lew D. Hilton, with the Cameron Iron Works Co., and the results obtained indicate that it will be applied to additional completions in this field and also to the tubing of wells under pressure.

Special Precautions Needed in Drilling to Prevent Drainage to Water Supply

By W. A. SPINNEY

When the Amerada Petroleum Corp. and the Stanolind Oil & Gas Co. decided to drill a wildcat well 9 miles northwest of Cushing, in the NE cor. SW Section 28-18-4, Payne County, it was an undertaking that required a number of additional features that the usual drilling well did not use. The location of this well was adjacent to a lake from which the townsite of Cushing receives its water supply. As the well location was in the drainage area which supplies the waters of the lake it was necessary to resort to unusual methods to protect the water from any kind of pollution, and also to provide future protection if the well should become an oil producer.

The elevation of the surface of the well is 902 feet above sea level, and the water level in the lake adjoining the well is 830 feet above sea level. It was therefore necessary for the companies to prevent drainage of any type from reaching the water supply. The lake is estimated to cover approximately 200 acres. The well location is only 660 feet west of the water level, which is the distance required under the laws of Oklahoma.



A section of the cement wall and part of the corrugated iron fence and the cement floor which was laid on two sides of the rig to expedite work

The corrugated galvanized iron fence on top of the cement wall which part way surrounds the well location. Also showing the rotary rig enclosed with the iron sheets part to the top of the rig

One of the first problems faced by the oil companies was to design a plan of procedure to stop all danger of waste material while the well was drilling, or afterwards, if it became a producer, from reaching the lake. In order to prevent any such possibility of pollution or danger from lawsuits in future years, it became necessary for the companies to build a cement wall part way around the rig location and the slush pits. The foundation of the rig was made of concrete, and a concrete floor was extended east and west from the rig for a distance of about 40 feet.

A careful survey was made of the area surrounding the location before drilling operations were started and a 12-foot solid corrugated galvanized iron fence was placed on top of the 6-foot wall part way around the location. The fence was anchored to the wall by brackets and outside supports, as shown in the picture. The extra height afforded by this wall and fence which surrounded the rig and slush pits prevented any splash from the drilling operations from going into the drainage area.

The wall is built where the ground elevation was low around the north, east and part of the south sides of the location. On the west side of the well location the natural ground was high enough to prevent any waste material reaching the drainage area as it sloped in the opposite direction.

To give the companies added protection from any possibility of pollution the rig was enclosed more than half way to the top with corrugated iron sheets. The well was drilled to its present total depth by three crews, in eight-hour tours. Each crew was required to scrub the rig floor and keep the equipment and the rig surroundings clean at all times.

The rotary rig used to drill the well to 4,000 feet is being dismantled and will be replaced by a standard rig, which will be entirely enclosed on all sides from top to bottom.

The plan used to prevent any of the waste material from the well reaching the waters of the lake was carefully worked out by the engineering departments of both companies. All of the extra equipment placed around the well location is permanent. In constructing and placing this material only the best obtainable was used at considerable extra expense and it will be good for many years of service. All these precautions were taken before drilling operations were started. While there have been a number of locations where wells have been drilled in a lake or at the tidewater and on the edge of a river, none is situated similar to this location in Oklahoma.

The well started to spud with rotary tools on December 30, 1932, after the drilling contract had been awarded to the Creekmore Drilling Co. The surface casing was landed December 31, 1932, and the well was shut down for about five days. The 8-inch casing was landed at 4,000 feet January 28, where it is now shut down to erect a standard rig and rig up standard tools. The top of the Viola lime was found at 3,987 feet.

Bureau of Mines Statistics for the Month of December, 1932

SUPPLY AND DEMAND OF ALL OILS

(Including wax, coke, and asphalt in thousands of barrels of 42 U. S. gallons)

	Dec., 1932	Nov., 1932*	Dec., 1931	Jan.-Dec., 1932	Jan.-Dec., 1931*
NEW SUPPLY:					
Domestic:					
Crude petroleum	58,044	63,384	73,327	781,845	851,081
Daily average	1,872	2,113	2,365	2,136	2,332
Natural gasoline	2,888	2,855	3,517	35,772	43,617
Benzol†	96	94	126	1,144	1,826
Total production	61,028	66,333	76,970	818,761	896,524
Daily average	1,969	2,211	2,483	2,237	2,456
Imports:					
Crude petroleum	2,746	1,963	4,315	44,688	47,250
Refined products	1,164	1,210	2,903	29,757	38,837
Total new supply, all oils	64,938	69,506	84,188	893,206	982,611
Daily average	2,095	2,317	2,716	2,440	2,692
Decrease in stocks, all oils	10,083	9,122	‡3,374	43,564	44,989
DEMAND:					
Total demand	75,021	78,628	80,814	936,770	1,027,600
Daily average	2,420	2,621	2,607	2,559	2,815
Exports:					
Crude petroleum	2,154	1,318	1,071	27,393	25,535
Refined products	4,621	5,696	6,101	75,695	98,859
Domestic demand	68,246	71,614	73,642	833,682	903,206
Daily average	2,201	2,387	2,376	2,278	2,475
Excess of daily average domestic production over domestic demand	‡232	‡176	107	‡41	‡19
STOCKS (end of month):					
Crude petroleum:					
East of California	299,378	307,281	328,805	299,378	328,805
California‖	39,340	40,264	42,114	39,340	42,114
Total refinable crude	338,718	347,545	370,919	338,718	370,919
Natural gasoline	2,197	3,049	2,818	2,197	2,818
Refined products‖	246,257	247,661	257,999	246,257	257,999
GRAND TOTAL STOCKS ALL OILS	588,172	598,255	631,736	588,172	631,736
Days' supply	243	228	238	230	221
Bunker oil (included above in domestic demand)	2,751	2,763	3,447	38,152	43,714

*Revised. †Based upon production of coke reported to Coal Division by those by-product coke plants that recover benzol products. ‡Increase. ‖Deficiency. ‖California heavy crude and residual fuel included under refined products.

PRODUCTION OF CRUDE PETROLEUM

(Thousands of barrels of 42 U. S. gallons)

	December, 1932 Total	December, 1932 Dly. av.	November, 1932 Total	November, 1932 Dly. av.	Jan.-Dec., 1932	Jan.-Dec., 1931*
Arkansas	922	30	960	32	11,907	14,791
California:						
Kettleman Hills	1,845	60	1,846	61	21,961	17,544
Long Beach	2,179	70	2,109	70	27,436	30,167
Santa Fe Springs	1,731	56	1,704	57	22,538	24,273
Rest of State	8,840	285	8,483	283	106,193	116,846
Total California	14,595	471	14,142	471	178,128	188,830
Colorado	84	3	89	3	1,177	1,545
Illinois	289	9	296	10	4,661	5,039
Indiana:						
Southwestern	49	2	50	2	776	803
Northeastern	2	.....	1	.....	28	37
Total Indiana	51	2	51	2	804	840
Kansas	2,642	85	2,870	96	34,300	37,018
Kentucky	453	15	490	16	6,264	5,456
Louisiana:						
Gulf Coast	1,022	33	1,031	34	11,355	9,560
Rest of State	840	27	859	29	10,123	12,244
Total Louisiana	1,862	60	1,890	63	21,478	21,804
Michigan	515	17	594	20	6,729	3,789
Montana	172	5	159	5	2,449	2,830
New Mexico	856	28	950	32	12,511	15,227
New York	262	8	258	9	3,501	3,363
Ohio:						
Central and Eastern	279	9	276	9	3,532	4,212
Northwestern	79	2	72	2	1,065	1,115
Total Ohio	358	11	348	11	4,597	5,327
Oklahoma:						
Oklahoma City	2,237	72	2,190	73	32,924	46,337
Seminole	3,306	107	3,243	108	42,983	47,883
Rest of State	6,282	202	6,226	208	76,714	86,354
Total Oklahoma	11,815	381	11,659	389	152,621	180,574
Pennsylvania	981	32	962	32	12,403	11,892
Tennessee	.....	.....	.....	.....	5	6
Texas:						
Gulf Coast	2,834	124	3,831	128	41,791	48,032
West Texas	5,048	162	4,975	166	63,542	78,524
East Texas	5,396	171	10,817	360	120,158	109,630
Rest of State	6,738	218	6,727	224	85,578	96,251
Total Texas	20,926	675	26,350	878	311,069	332,437
West Virginia	296	9	287	10	3,882	4,472
Wyoming:						
Salt Creek	603	19	636	21	8,006	8,834
Rest of State	362	12	393	13	5,353	6,000
Total Wyoming	965	31	1,029	34	13,359	14,834
Total U. S.	58,044	1,872	63,384	2,113	781,845	851,081

*Includes 7,000 bbls. for Alaska and Utah.

INDICATED DOMESTIC DEMAND FOR CRUDE PETROLEUM

(Thousands of barrels of 42 U. S. gallons)

	December, 1932 Total	December, 1932 Dly. av.	November, 1932 Total	November, 1932 Dly. av.	Jan.-Dec., 1932	Jan.-Dec., 1931*
Domestic petroleum by fields of origin:						
Appalachian:						
Pennsylvania grade	1,714	55	1,684	56	21,136	23,190
Other (inc. Kentucky)	572	19	610	20	8,426	8,326
Lima-N. E. Ind.-Mich.	720	23	685	23	8,363	4,673
Ill.-S. W. Ind.	182	6	440	15	4,037	6,268
Mid-Continent:						
N. La. and Ark.	2,552	82	2,394	80	26,841	32,828
W. Tex.-S. E. N. Mex.	6,454	208	6,490	216	78,339	105,281
Other (Okla., Kans., N. Tex., etc.)	33,261	1,073	33,710	1,123	418,390	435,714
Gulf Coast	5,466	177	5,540	185	54,924	64,684
Rocky Mountain	877	28	1,168	39	14,798	21,692
California	14,667	473	13,133	438	175,211	5
Total demand	66,465	2,144	65,854	2,195	810,465	702,571
Exports	2,154	69	1,318	44	27,393	17,690
Domestic demand	64,311	2,075	64,536	2,151	783,072	684,881
Foreign petroleum	2,300	74	2,832	95	42,578	46,609
Total domestic demand	66,611	2,149	67,368	2,246	825,650	731,490

*East of California.

IMPORTANT REVISIONS FOR JANUARY TO OCTOBER, 1932

(Thousands of barrels)

	Dec., 1931	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
MOTOR FUEL:										
Production	.....	33,344	31,735	32,945	34,058	35,831	34,568	33,848	.....	.....
Stocks	51,521	56,604	61,232	62,773	63,402	63,599	56,596	57,079	52,908	.....
GASOLINE:										
Production:										
Indiana-Illinois	.....	4,613	4,667	5,148	5,506	5,558	5,221	5,389	.....	.....
Oklahoma-Kansas	.....	4,184	3,870	4,199	4,544	4,659	4,649	4,432	.....	.....
Rocky Mountains	.....	895	660	.....	.....	.....	.....	789	.....	.....
Cracked: Tex. Gulf	.....	3,224	2,801	2,368	2,667	3,149	3,087	.....	.....	.....
Stocks—Ref'y:										
East Coast	4,411	5,255	6,623	7,066	6,872	6,614	6,129	6,325	.....	.....
Indiana-Illinois	3,655	4,494	5,617	6,516	6,490	6,549	5,445	.....	.....	.....
Oklahoma-Kansas	3,406	3,684	4,182	4,154	4,035	4,248	2,963	3,428	3,162	.....
Texas Inland	2,058	2,199	2,377	2,062	1,981	.....	.....	.....	.....	.....
Louisiana Gulf	1,225	1,212	1,533	1,905	2,020	1,786	1,501	1,607	.....	.....
Rocky Mountains	1,532	1,944	2,078	.....	.....	.....	.....	.....	1,673	.....
Stocks—Bulk:										
East Coast	8,214	9,075	8,704	9,881	10,679	11,680	.....	.....	.....	.....
Oklahoma-Kansas	796	991	1,112	1,010	1,082	.....	.....	.....	.....	.....
Texas Gulf	126	251	189	251	263	.....	.....	.....	.....	.....
RESIDUAL:										
Production:										
East Coast	.....	4,327	4,013	4,436	4,199	4,106	4,193	4,516	4,132	.....
Indiana-Illinois	.....	1,833	1,305	.....	.....	1,055	820	886	1,046	.....
Oklahoma-Kansas	.....	.....	.....	.....	.....	.....	.....	1,361	.....	.....
Rocky Mountains	.....	143	136	.....	.....	.....	.....	257	262	203
Stocks:										
Texas Inland	.....	.....	.....	.....	.....	.....	3,393	.....	.....	.....
Texas Gulf	.....	.....	.....	.....	.....	.....	.....	7,366	7,698	.....
WAX (thous. of lbs.):										
Stocks—scale:										
Appalachian	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,276
MISCELLANEOUS:										
Production:										
Indiana-Illinois	.....	26	33	30	33	16	25	23	.....	.....
Oklahoma-Kansas	.....	6	14	9	12	8	6	6	.....	.....
Stocks:										
Indiana-Illinois	200	124	141	150	154	145	148	.....	...	...
Oklahoma-Kansas	.....	21	25	17	20	22	18	.....	.....	.....
UNFINISHED:										
Production:										
East Coast	.....	126	531	281	956	912	962	621	534	....
Indiana-Illinois	.....	325	295	.....	.....	474	430	652	274	.....
Rocky Mountains	.....	209	359	.....	.....	.....	.....	.....	196	103
Stocks:										
East Coast	7,367	7,418	7,340	7,006	7,338	7,833	.....	.....	.....	.....
Oklahoma-Kansas	3,270	.....	.....	.....	.....	3,176	3,170	3,339	.....	.....
Louisiana Gulf	1,861	2,074	2,227	2,072	2,199	2,149	2,041	1,999	.....	.....
Rocky Mountains	1,821	1,814	.....	.....	.....	.....	.....	.....	1,869	.....
GASOLINE STOCKS:										
Bulk:										
Texas Inland	120	80	.....	.....	.....	.....	.....	.....	.....	.....
Louisiana Gulf	202	204	322	379	.....	.....	.....	.....	.....	.....
Ark.-La. Inland	424	187	.....	.....	.....	.....	.....	.....	.....	.....
GAS OIL, etc.:										
Production:										
Indiana-Illinois	.....	867	788	.....	.....	.....	.....	.....	.....	.....
Rocky Mountains	.....	.....	38	.....	.....	.....	.....	.....	.....	.....
LUBRICANTS:										
Production: E. Coast	.....	.....	632	.....	.....	.....	.....	.....	.....	.....
Stocks: E. Coast	3,073	3,099	3,269	.....	.....	.....	.....	.....	.....	.....
WAX (thous. of lbs.):										
Stocks:										
Scale: E. Coast	22,874	24,780	25,402	24,618	.....	.....	.....	.....	.....	.....
Refined: E. Coast	17,643	22,533	.....	.....	.....	.....	.....	.....	.....	.....
MISCELLANEOUS:										
Production:										
Rocky Mountains	.....	10	3	.....	.....	.....	.....	.....	.....	.....
Stocks:										
Rocky Mountains	79	82	81	.....	.....	.....	.....	.....	.....	.....
UNFINISHED:										
Production:										
Oklahoma-Kansas	.....	406	172	.....	.....	.....	.....	.....	.....	.....
Stocks:										
Indiana-Illinois	6,827	.....	.....	.....	.....	.....	.....	.....	.....	.....
SHORT:										
Indiana-Illinois	.....	49	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma-Kansas	.....	273	.....	.....	.....	.....	.....	.....	.....	.....
NATURAL GASOLINE:										
Stocks: East Coast	.....	49	.....	.....	.....	.....	.....	.....	.....	.....

STOCKS HELD BY REFINING COMPANIES, DECEMBER 31, 1932

(Thousands of barrels of 42 U. S. gallons)

	Gasoline: At refineries	Gasoline: *At bulk terminals	Gasoline: Total	Kerosene	Gas oil and distillate fuels	Residual fuel oils
East Coast	4,856	7,757	12,613	*973	3,377	4,936
Appalachian	1,261	442	1,703	219	616	272
Ind., Ill., Ky., etc.	3,420	3,333	6,753	451	1,750	1,775
Okla., Kans., Mo.	3,522	825	4,347	334	1,113	2,149
Texas Inland	1,603	44	1,647	77	342	2,539
Texas Gulf	5,585	221	5,806	811	2,070	5,638
Louisiana Gulf	1,064	89	1,153	334	809	1,863
Ark. and La. Inland	245	352	597	14	112	417
Rocky Mountain	1,192	.....	1,192	197	118	289
California	12,656	(†)	12,656	1,564	3,802	‡95,933
Total	35,404	13,063	48,467	4,974	14,110	115,861

	Wax (thousands of pounds): Lubricants	Wax (thousands of pounds): Crude scale	Wax (thousands of pounds): Refined	Wax (thousands of pounds): Total	Coke (tons)
East Coast	2,695	21,005	17,751	38,756	29,300
Appalachian	1,075	19,673	2,443	22,116	7,300
Ind., Ill., Ky., etc.	1,004	22,993	2,076	25,069	91,700
Okla., Kans., Mo.	490	1,675	1,303	2,978	151,000
Texas Inland	86	.....	284	284	135,300
Texas Gulf	1,897	2,514	8,904	11,418	615,400
Louisiana Gulf	70	30,343	1,612	31,955	64,300
Ark. and La. Inland	10	.....	.....	.....	.....
Rocky Mountain	185	29,190	2,826	32,016	131,800
California	863	.....	.....	.....	§104,100
Total	8,375	127,393	37,199	164,592	1,330,200

	Asphalt (tons)	Road oil	Miscellaneous products	Unfinished oils	Natural gasoline
East Coast	34,200	103	55	7,277	91
Appalachian	8,300	20	38	1,648	2
Ind., Ill., Ky., etc.	67,500	40	130	5,986	50
Okla., Kans., Mo.	5,100	90	20	3,368	22
Texas Inland	.....	17	6	1,026	4
Texas Gulf	6,000	13	11	10,897	219
Louisiana Gulf	39,800	7	3	2,016	....
Ark. and La. Inland	22,800	....	4	472	4
Rocky Mountain	2,700	83	....	2,335	5
California	39,600	191	189	18,330	2,361
Total	276,100	564	456	43,355	2,748

*Revised figure for November 30, 1932, 1,007,000 bbls. †Included with "at refineries." ‡Includes heavy crude. §Revised figure for November 30, 1932, 103,700 short tons. ‖Includes 4,907,000 bbls. tops.

NUMBER OF WELLS COMPLETED IN THE UNITED STATES*

	Dec., 1932	Nov., 1932†	Dec., 1931	Jan.-Dec., 1932	Jan.-Dec., 1931
Oil	793	855	744	10,444	6,788
Gas	88	89	129	1,027	1,985
Dry	319	304	240	3,569	3,658
Total	1,200	1,248	1,113	15,040	12,432

*From The Oil and Gas Journal and California office of the American Petroleum Institute. †Revised.

COMPARATIVE ANALYSES
(Thousands of barrels of 42 U. S. gallons)

	December, 1932 Total	December, 1932 Dly. av.	November, 1932 Total	November, 1932 Dly. av.	Jan.-Dec., 1932	Jan.-Dec., 1931
CRUDE PETROLEUM:						
Runs to stills: Domestic	63,257	2,041	62,783	2,092	777,696	847,671
Foreign	2,741	88	2,721	91	42,301	46,937
Total	65,998	2,129	65,504	2,183	819,997	894,608
Imports	2,746	89	1,963	65	44,688	47,250
Exports	2,154	69	1,318	44	27,393	25,535
MOTOR FUEL:						
Production	31,607	1,020	32,672	1,089	399,145	437,735
Imports	56	2	121	4	8,209	13,621
Exports*	1,953	63	2,387	80	35,434	45,716
Stocks†	49,671	.....	47,152	.....	49,671	51,521
Domestic demand	27,191	877	30,294	1,010	373,770	403,418
KEROSENE:						
Production	4,097	132	3,801	127	43,826	42,446
Imports	.....	.....	.....	.....	72	11
Exports	646	21	972	32	10,956	12,712
Stocks	4,974	.....	‡4,672	.....	4,974	5,332
Domestic demand	3,149	102	‡3,621	121	33,319	31,296
GAS OIL AND FUEL OIL:						
Production	24,471	789	23,650	788	294,287	326,967
Transfers§	827	27	835	28	6,141	(¶)
Imports	1,088	35	1,072	36	21,229	24,998
Exports	1,332	43	1,472	49	19,874	29,231
Stocks	129,971	.....	133,971	.....	129,971	135,856
Domestic demand	29,054	937	27,560	919	307,668	(¶)
LUBRICANTS:						
Production	1,625	52	1,644	55	22,433	26,704
Imports	.....	.....	.....	.....	11	32
Exports	452	15	573	19	6,857	8,128
Stocks	8,375	.....	8,245	.....	8,375	9,485
Domestic demand	1,042	34	1,115	37	16,697	20,068
WAX (thousands of lbs.):						
Production	35,880	1,129	33,320	1,111	455,920	477,400
Imports	4,171	135	2,201	73	32,256	37,835
Exports	21,600	697	25,525	851	235,323	290,527
Stocks	164,592	.....	180,441	.....	164,592	171,220
Domestic demand	33,429	1,078	18,192	606	263,481	276,457
COKE (short tons):						
Production	149,600	4,826	146,700	4,890	1,788,800	2,032,000
Stocks	1,330,200	.....	‡1,393,900	.....	1,330,200	1,511,600
ASPHALT (short tons):						
Production	140,900	4,545	176,700	5,890	2,409,000	2,976,500
Imports (natural)	800	19	1,400	47	20,400	.....
Stocks	276,100	.....	279,500	.....	276,100	301,800
ROAD OIL:						
Production	129	4	190	6	5,879	5,177
Stocks	564	.....	499	.....	564	333
STILL GAS:						
Production	3,314	107	3,311	110	40,905	38,630
MISCELLANEOUS:						
Production	315	10	196	7	2,568	4,150
Stocks	456	.....	485	.....	456	734

*Includes benzol—1,743 bbls. in December, 1932. †Stocks of motor fuel in 1932 include terminal and transit stocks. ‡Revised. §Includes crude used as fuel and net transfers to fuel oil stocks. ¶Not available.

RUNS TO STILLS AND OUTPUT OF REFINERIES, DECEMBER, 1932
(Thousands of barrels of 42 U. S. gallons)

INPUT—	Crude oil: Domestic	Crude oil: Foreign	Crude oil: Total	Unfinished oils rerun	Natural gasoline	Total input
East Coast	10,948	2,596	13,544	1,151	101	14,796
Appalachian	2,571	0	2,571	224	28	2,823
Ind., Ill., Ky., etc	8,441	0	8,441	304	174	8,919
Okla., Kans., Mo.	6,733	0	6,733	357	455	7,545
Texas Inland	3,925	0	3,925	74	243	4,242
Texas Gulf	12,304	54	12,358	411	275	13,044
Louisiana Gulf	2,477	91	2,568	130	24	2,722
Ark. and La. Inland	1,459	0	1,459	302	40	1,801
Rocky Mountain	912	0	912	107	75	1,094
California	13,487	0	13,487	451	*843	14,779
Total	63,257	2,741	65,998	3,511	2,256	71,765

OUTPUT—	Gasoline	Kerosene	Gas oil and distillate fuels	Residual fuel oils	Unfinished Lubricants	Wax (thousands pounds)
East Coast	6,170	908	1,186	4,174	523	16,800
Appalachian	1,287	246	140	338	299	6,720
Ind., Ill., Ky., etc.	4,483	194	830	1,603	144	840
Okla., Kans., Mo.	3,822	466	707	1,438	211	3,080
Texas Inland	2,210	198	272	1,068	18	280
Texas Gulf	5,869	1,006	1,018	2,738	314	2,520
Louisiana Gulf	924	389	100	579	31	1,400
Ark. and La. Inland	651	61	170	512	7	8
Rocky Mountain	549	39	50	129	—17	3,360
California	5,259	590	1,507	5,912	95	0
Total	†31,254	4,097	5,930	18,491	1,625	35,000

OUTPUT (Cont'd.)—	Coke (tons)	Asphalt (tons)	Road oil	Still gas	Miscellaneous	Unfinished products	Shortage
East Coast	15,300	67,800	34	820	14	374	82
Appalachian	2,800	3,300	—2	166	15	197	81
Ind., Ill., Ky., etc.	59,000	12,700	12	646	22	592	19
Okla., Kans., Mo.	18,800	2,400	18	265	6	251	241
Texas Inland	3,700	0	6	87	6	89	268
Texas Gulf	33,700	3,200	—1	859	3	909	102
Louisiana Gulf	5,100	16,300	2	88	236	125	127
Ark. and La. Inland	200	6,400	0	43	—6	283	44
Rocky Mountain	7,100	0	22	42	1	192	39
California	3,900	23,800	38	298	18	507	374
Total	149,600	140,900	129	3,314	315	3,519	1,378

*Includes 102,000 bbls. run through pipe lines. †Includes 444,000 bbls. special naphthas.

PRODUCTION OF CRUDE PETROLEUM BY FIELDS
(Thousands of barrels of 42 U. S. gallons)

FIELD:	December, 1932 Total	December, 1932 Dly. av.	November, 1932 Total	November, 1932 Dly. av.	Jan.-Dec., 1932	Jan.-Dec., 1931*
Appalachian:						
Pennsylvania grade	1,671	54	1,643	55	21,513	21,893
Other (inc. Kentucky)	600	19	630	21	8,074	8,508
Lima-N. E. Ind.-Mich.	596	19	667	22	7,822	4,941
Ill.-S. W. Ind.	338	11	346	12	5,437	5,842
Mid-Continent:						
N. La. and Ark.	1,762	57	1,819	61	22,030	27,035
W. Tex.-S. E. N. Mex.	5,843	189	5,890	196	75,637	93,228
Other (Okla., Kans., N. Tex., etc.)	26,581	856	32,073	1,069	392,657	423,473
Gulf Coast	4,856	157	4,862	162	53,146	57,592
Rocky Mountain	1,257	40	1,312	44	17,401	19,139
California	14,593	471	14,142	471	178,128	188,830
Total	58,211	1,872	63,384	2,113	781,845	851,681

*Includes 7,000 bbls. for Alaska and Utah.

SHIPMENTS FROM CALIFORNIA TO EASTERN PORTS IN UNITED STATES*
(Thousands of barrels of 42 U. S. gallons)

	Dec., 1932	Nov., 1932	Dec., 1931	Jan.-Dec., 1932	Jan.-Dec., 1931
Gasoline	445	480	1,262	8,396	13,854
Natural gasoline	73	153	73	515	1,748
Kerosene	104	105	.....	570	194
Gas oil and Diesel oil	420	532	95	2,062	1,708
Fuel oil	..	176	.....	277	2
Lubricants	8	.....	10	45	84
Asphalt	.....	.....	1	6	15
Miscellaneous	1	73	.....	164	.....
Total	1,051	1,519	1,441	12,036	17,605

*Compiled by E. T. Knudsen of the San Francisco office of the Bureau of Mines.

RECORD OF WELLS FOR IMPORTANT FLUSH FIELDS, DECEMBER, 1932*

	Completions: Oil	Gas	Dry	Total initial production (bbls.)	Average initial production (bbls.)	Drilling Dec. 31
Texas	514	10	154	934,300	1,800	914
East Texas†	348	...	12	835,200	2,400	212
Gulf Coast	63	2	25	72,400	1,100	162
West Texas	14	2	8	3,000	200	113
California	13	...	8	9,100	700	82
Kettleman Hills	1	...	...	1,000	1,000	11
Long Beach	2	...	1	600	300	11
Playa Del Rey	...	...	1	.....	.....	...
Oklahoma	76	9	29	38,600	500	331
Oklahoma County	10	2	...	28,900	2,900	35
Pottawatomie Co.-Seminole Co.	9	...	1	2,600	300	26
New Mexico	7	...	2	38,900	5,600	59
Lea County (Hobbs)	6	...	...	38,900	5,600	12
Other states	193	69	126	27,300	100	854
Total United States	793	88	319	1,048,200	1,300	2,289

*From The Oil and Gas Journal and California office of the American Petroleum Institute. †Initial production for the East Texas Field calculated from field reports.

STOCKS OF CRUDE PETROLEUM
(Thousands of barrels of 42 U. S. gallons)

EAST OF CALIFORNIA:	Dec. 31, 1932*	Nov. 30, 1932*	Dec. 31, 1931
At refineries by location:			
East Coast: Domestic	7,604	8,112	7,709
Foreign	5,405	4,906	3,691
Appalachian	2,250	2,220	1,956
Indiana, Illinois, Kentucky, Michigan	3,529	3,734	3,552
Oklahoma, Kansas, Missouri	4,589	4,573	5,527
Texas: Inland	1,490	1,421	1,954
Texas: Gulf Coast: Domestic	5,882	6,096	6,452
Foreign	83	136	137
Louisiana Gulf Coast: Domestic	3,298	2,712	2,427
Foreign	1,116	1,116	662
Arkansas and Inland Louisiana	445	561	549
Rocky Mountain	12,211	11,981	1,927
Total	47,902	47,568	36,546
At refineries by origin:			
Pennsylvania Grade	2,135	2,106	1,689
Other Appalachian (inc. Kentucky)	623	654	659
Lima-NE Indiana-Michigan	209	242	261
Illinois-SW Indiana	104	65	121
N. Louisiana and Arkansas	2,240	2,073	1,734
West Texas and SE New Mexico	3,873	4,107	2,257
Oklahoma, Kansas, North Texas, etc.	15,540	15,546	17,554
Gulf Coast	4,410	4,684	5,005
Rocky Mountain	12,164	11,933	1,741
Foreign	6,604	6,158	4,491
Total	47,902	47,568	36,546
Pipe line and tank farm:			
Pennsylvania Grade	4,858	4,930	4,927
Other Appalachian (inc. Kentucky)	903	844	1,183
Lima-NE Indiana-Michigan	1,069	1,159	1,560
Illinois-SW Indiana	11,210	11,094	9,790
N. Louisiana and Arkansas	11,662	12,630	16,989
West Texas and SE New Mexico	32,072	32,439	35,460
Oklahoma, Kansas, North Texas, etc.	155,893	162,768	179,536
Gulf Coast	12,130	12,453	13,316
Rocky Mountain	15,579	15,446	23,300
Total	245,376	253,762	286,057
Total refinery, pipe line and tank farm	293,278	301,331	322,603
Producers'	6,100	5,950	6,202
Total crude east of California	299,378	307,281	328,805
CALIFORNIA: Light	39,340	40,264	42,114
Total refinable crude in the United States	338,718	347,545	370,919

*Revised.

GASOLINE PRODUCTION BY THE VARIOUS METHODS, DECEMBER, 1932
(Thousands of barrels of 42 U. S. gallons)

	Straightrun: Total	Straightrun: Per cent (*)	Straightrun: Per cent (†)	Cracked: Total	Cracked: Per cent (*)	Cracked: Per cent (†)	Natural gasoline: Total	Natural gasoline: Pct. (†)	Gasoline: Total	Gasoline: Pct. (*)
East Coast	2,751	20 3	44.6	3,318	24.5	53 8	101	1.6	6,170	44.8
Appalachian	658	25.6	51 1	601	23 4	46 7	28	2 2	1,287	49.6
Ind., Ill., etc.	1,955	23.1	43 6	2,354	27.9	52.5	174	3 9	4,483	51.0
Okla., Kans., Mo.	1,890	25 1	49 4	1,477	22.0	38 7	455	11 9	3,822	50 1
Texas Inland	1,340	34.1	60 6	627	16.0	28 4	243	11.0	2,210	50.1
Texas Gulf	2,467	20.0	42.0	3,127	25 2	53 2	275	4 7	5,869	45.3
Louisiana Gulf	496	19 3	53 7	404	15.7	43.7	24	2 6	924	35.9
Ark. and La. Inland	301	20.6	46.2	310	21 3	47 6	40	6 2	651	41.9
Rocky Mountain	278	20.5	50 6	196	21.5	35 7	75	13.7	549	52.5
California	3,176	23 6	60 0	1,272	9.4	24 1	841	15 9	5,289	33 0
Total	15,312	23.2	49.0	13,686	20.7	43.8	2,256	7 2	31,254	43 9

*Per cent of crude run. †Per cent of total gasoline output.

PRODUCTION OF MOTOR FUEL
(Thousands of barrels of 42 U. S. gallons)

	Dec., 1932 Total	Dec., 1932 Daily av.	Nov., 1932 Total	Nov., 1932 Daily av.	Jan.-Dec., 1932	Jan.-Dec., 1931
Straightrun gasoline	15,312	494	15,443	515	195,386	219,957
Cracked gasoline	13,686	442	14,240	474	170,905	176,437
Natural gasoline:						
Blended at refineries	2,154	70	2,293	77	25,081	33,974
Blended at plants*	7	0	6	0	51	148
Run through pipe lines	102	3	96	3	1,251	1,142
Exports and sales to jobbers	250	8	500	17	5,327	4,250
Benzol produced	96	3	94	3	1,144	1,826
Total motor fuel	31,607	1,020	32,672	1,089	399,145	437,735

*East of California. †To refineries in California.

SHIPMENTS OF MOTOR FUEL BY PIPE LINES

	Dec., 1932	Nov., 1932	Dec., 1931	Jan.-Dec., 1932	Jan.-Dec., 1931
Motor fuel turned into lines	2,331	2,723	1,937	29,901	14,735
Motor fuel delivered from lines	2,479	2,564	1,721	29,573	12,766
Shortage	7	12	7	93	58
Stocks in lines and working tanks end of month	1,198	1,353	2,111	1,198	962

Fines and Imprisonment for Proration Violators

(Continued from Page 10)

make rules and regulations without any notice, so long as the rules are not inconsistent with the purpose of this act.

Section 19 fixed the penalty for contempt at a fine of not more than $1,000 or jail sentence, or both. Penalty for violation of the commission orders is fixed at a fine not to exceed $5,000, wich each day's violation to constitute a separate offense. It further provides that any fine assessed may be considered a lien upon the property of the offender and the fine or judgment may be collected as in other court procedure, and be credited by the state treasurer to the proration fund.

Section 20 outlines the filing of contempt proceedings as to who shall do it and how.

Right of Inspection

Section 21 gives the proration umpire or his assistant or deputies the right at all times to go upon and inspect oil and gas properties for the ascertaining of whether the commission orders are being obeyed.

Section 22 empowers the commission to issue shutdown or restraint orders against properties of violators of the orders; it also provides for curtailment of the flow of wells, and it details the manner in which action shall be taken.

Section 23 provides for notification of operators and others so involved in the proceedings as to contempt or other matters.

Section 24 applies to the service of process and notices on corporations or firms.

Section 25 fixes a penalty of not more than five years for perjury in connection with filing of reports, etc., or for false testimony or representations at hearings, or on affidavits.

Section 26 fixes penalty for false verification of reports, plats, maps or other material, at imprisonment at not less than two years nor more than 10 years.

Section 27 provides who shall testify and what information will be expected at hearings for determining the market demand of pools.

Review by Supreme Court

Section 28 provides that "no collateral attack shall be allowed upon orders, rules and regulations of the commission made hereunder" . . . but that the sole method of review shall be by appeal to the State Supreme Court, adding "no court of this State except the Supreme Court, and it only on appeal, as herein provided shall have jurisdiction to review . . . " the acts of the commission.

Section 29 defines who has right of appeal and the procedure of so doing. (Any person affected by the legislative or administrative orders of the commissiou may appeal.)

Section 30 further outlines the method of appeal to the Supreme Court and declares that no rule, or order of the commission "shall be superseded except by order of the commission or of the Supreme Court," and the matter of such action is defined and outlined.

Obstruction of Umpires

Section 31 makes it a misdemeanor for any person to delay or obstruct the action or procedure of the corporation umpire, his assistant or deputies, and the penalty is fixed at $500 in fine or commitment to the county jail for a period not to exceed six months, or both. It further provides if such obstruction or threat is had by use of firearms or deadly weapons the offense shall constitute a felony with punishment at not less than one and not more than five years' imprisonment.

Section 32 provides a penalty of not more than $5,000 fine or imprisonment in the state penitentiary of not more than five years, or both, for conspiracy to violate any provision of this act or of any lawful order of the commission.

Section 33 provides for injunction procedure against any operator who violates the commission orders, and such injunction procedure is reviewable only upon appeal to the State Supreme Court.

Penalty for Bribery

Section 34 provides "whoever corruptly gives, offers or promises to give . . . any gift or gratuity whatever with an intent to influence" to the umpire or any of his employes, shall be punished by imprisonment of not more than five years and by a fine not exceeding $5,000.

Section 35 is directed against the proration umpire or his employes who accept such gifts or gratuities with punishment fixed at imprisonment of not to exceed 10 years and a fine not to exceed $10,000.

Section 36 provides immunity from prosecution for informants and witnesses in cases charging violations under Sections 32, 34 and 35 of this act.

Section 37 provides that "any grant of specific power or powers, and any imposition of any specific duty or duties upon the commission by the provisions of this act shall not be construed to restrict or limit the general powers granted and the general duties imposed upon the commission with respect to the enforcement of the provisions of this act."

Employment Is Fixed

Section 38 created the office of proration umpire, to be filled by appointment of the governor and approval of the senate. The umpire shall give a bond of $10,000 and his tenure of office shall be continuous with the governor making the appointment, and he shall be subject to removal by the governor. The umpire's salary is fixed at $12,000 per annum.

Section 39 provides that the governor shall appoint an assistant proration umpire, to receive a salary of $6,000 per year, and who shall have the same power as the umpire and he shall give a bond of $10,000.

Section 40 created the office of proration attorney, appointment by the governor and approval of the senate, at a salary of $12,000 per year. The section defines his duties and powers.

Hiring of Deputies

Section 41 authorizes the proration umpire to hire not to exceed 30 deputies, to be known as deputy proration umpires, same to have approval of the governor; not more than five deputies are to receive $3,000 per year; not more than five to receive $2,400 per year, and 20 to receive $1,800 per year.

Section 42 provides for hiring of stenographic and clerical help, the chief clerk to receive $2,700 per year, and remainder of the clerks and stenographers to receive $1,500 per year.

Section 43 delegates the power and authority of a peace officer upon the umpire, his assistant and deputies, and allows mileage and expenses incident to their work.

Section 44 provides for extra office help, not to exceed two reporters at a salary of $2,400 per year; two stenographers at a salary of $1,500 per year and two clerks at $1,500 per year.

Section 45 permits the commission to designate one or more of its agents or employes to act as inspectors for the commission.

Section 46 empowers the State Board of Affairs to provide rooms, furniture and supplies for the proration office.

Sets Up Proration Fund

Section 47 sets up a "proration fund" under the state treasurer, from which all salaries and expenses shall be paid.

Section 48 holds that "if any section, paragraph, sentence or phrase of this act shall be declared unconstitutional, or void for any reason . . . such fact shall not in any manner invalidate or effect any other" part of the act.

Section 49 holds that "all acts and parts of acts in conflict with this act are hereby repealed, provided the repeal . . shall not affect any valid orders, rules or regulations of the commission heretofore made and issued by it under . . . the act approved February 11, 1915.

Engineers and Production Men Meet at Wichita

(Continued from Page 8)

tended because of change in election dates. The other officers for the Mid-Continent section are H. L. McQuiston, Phillips Petroleum Co., Wichita, Kans., first vice chairman; J. E. Warren, Continental Oil Co., Borger, Tex., second vice chairman; B. O. Hindman, I.T.I.O. Co., Seminole, Okla., third vice chairman; and F. W. Floyd, Carter Oil Co., Tulsa, secretary and treasurer. E. J. Nicklos, Continental Oil Co., Ponca City, Okla., was elected chairman of the board of advisors and R. K. Huey, Deep Rock Oil Co., Tulsa, vice chairman. The advisors committee is made up of the same men who served last year with the exception of W. A. Martin, Prairie Sinclair Oil & Gas Co., Tulsa, and J. D. McNutt, Pure Oil Co., Tulsa, who take the place of two advisors whose terms of office have been completed.

The Wichita chapter also held a meeting and elected A. J. McQuiston, Barnsdall Oil Co., Wichita, Kans., chairman; T. J. Hamilton, Phillips Petroleum Co., McPherson, Kans., first vice chairman; J. N. Sergeant, Drillers' Supply Co., Wichita, Kans., second vice chairman, and H. A. Glover, Derby Oil Co., Wichita, Kans., secretary-treasurer.

On Saturday afternoon a group of visitors were taken over the McPherson County, Kansas, oil fields in an airplane.

Straightrun Gasoline Giving Way to Cracked Gasoline

(Continued from Page 11)

in technology and because material and labor are relatively cheap.

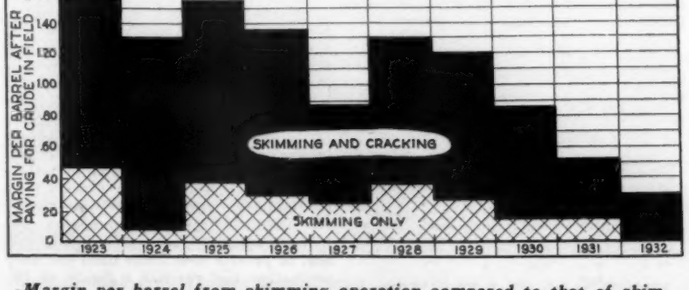
The lower operating cost of such a unit will hasten the time when refiners will feel justified to write off their present investment and install the new.

Another worry that has entered the minds of refiners since prices have fallen, is the possibility that modern units of this type will be built at many strategic marketing locations and these will offer serious competition to those plants that are forced to carry the inherited investment from past years. Obviously, the problem is most serious in those plants where a liberal chargeoff has not been made yearly.

AVERAGE OF WEEKLY PRICES USED AS BASIS FOR CALCULATING MARGIN OF REVENUE PER BARREL OF CRUDE PROCESSED THROUGH TWO TYPES OF PLANTS

(Price per gallon except fuel oil, crude and coke)

Product—	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Gasoline	$.0978	$.0896	$.1055	$.1031	$.0667	$ 0795	$ 0775	$ 0634	$.0345	$.0392
Kerosene	.0400	.0449	.0445	.0727	.0461	.0517	.0517	.0358	.0231	.0315
Distillate	.0305	0350	.0366	.0473	.0353	.0313	.0365	.0294	.0185	.0242
Gas oil	9266	9291	.0327	.0419	.0299	.0247	.0265	.0227	.0127	.0146
Fuel oil, bbl.	9511	.9540	0908	1.2207	.889	.6298	.5260	.5225	.2904	.3250
Crude, bbl.	1 56	1.63	1 87	2.13	1.38	1.31	1 37	1.23	.63	.88



Margin per barrel from skimming operation compared to that of skimming and cracking based on constant yields and average yearly prices

Development of Acid Treatment of Oil Wells

(Continued from Page 8)

of sealing itself back in the pores and shutting off the oil. This is especially true in old fields where the gas pressure has been depleted.

We will next consider the blend of acid to use in connection with the rock which it is to attack. As previously mentioned, straight hydrochloric acid does not work well on silicious and dolomitic lime, so it is necessary to use other acids in connection with this treatment in such a way as to get the desired results without jeopardizing the action which will take place in the rock. For instance, a great many times sulphuric acid has been used in attempting to treat oil wells in lime formation, the result being a formation of calcium sulphate or gypsum, which is insoluble in water and which sets up in a hard cement and can only be drilled out. It is, therefore, impractical to use sulphuric acid alone.

Pressure Methods

The next item of importance is the use of pressure in the application of the acid, including the method of developing the pressure as well as the amount to be used. In certain types of formations, it is not desirable on the first treatment to force the acid too far into the rock. That is especially true where a considerable amount of paraffin is in the bottom of the hole. On second treatments, it is desirable to use as high a pressure as possible and a slow reacting acid that will penetrate before the reaction takes place. In treating an oil well, two principles are used. One by putting in enough oil to reach to the casing seat, thereby protecting it, especially if in lime formation. The other is to use a packer below the casing seat, setting it in tight enough to prevent by-passing at that point. The oil method is preferable and is used in every case where it is possible to do so, although the packer has been used with some success in many fields.

The last use of oil is to follow the treatment into the rock, where the chemical action takes place.

The next important factor in the present method of treating oil wells consists of using a blanket, which is put in the bottom of the well that is to be treated in order to direct the acid into the actual pay itself. This is put in after the first oil and before the acid is put down. This prevents two things: First, the acid from going in the bottom of the hole, forcing it out to the sides; and the second is to insure the effective use of all the acid which is put into the well.

Brine Seal

The next is the brine seal which is necessary to use in all wells where brine is coming in at any point below where it could be shut off with a packer. The brine seal consists of oil soluble material but insoluble in brine so that as soon as it encounters brine, immediately precipitates and shuts off that particular opening. It is especially necessary in connection with wells where the brine is coming from the bottom and also where brine is coming in with the oil, the big factor being that the brine openings offer less resistance than the oil openings, probably

due to the viscosity difference between the two materials. Consequently, the acid will follow brine more easily than oil. Our experience has been that where brine is coming in with the oil we have not radically changed the ratio between oil and brine, although we have increased the oil considerably. Where the brine is not coming in with the oil, we have been able, in most cases, to stop it off very effectively. It may be possible, at some time, to develop a treatment whereby the brine can be stopped entirely, but that is, at the present moment, like the problem of the impossible. However, experience shows that ordinarily the brine is increased for the first week or 10 days after the treatment and then gradually drops off, so that leveling off of the well shows a decided decrease in brine ratio to the oil production, the theory being that we open up pockets of brine that has been stored and until that is drained off we have to expect more water.

Paraffin Solvents

The next factors are the paraffin solvents, which are used in connection with this particular service. There are two methods of using solvents. One is to put in the solvent with what we term a "hot shot," or a chemical means of heating the solvent and then pumping off the materials loosened up, following with the acid treatment. The other is to give the acid treatment first and then paraffin treatment last. A considerable amount of care must be exercised in using paraffin treatments so that the paraffin is not diluted and forced back into the rock where it sets and seals off the fluid and in many cases, it is unadvisable to use the paraffin treatment first for this reason. On the other hand, it is undesirable to give the pressure treatment with the acid first because the paraffin in the bottom of the hole may be shoved back into the rock and acid cannot penetrate only where the brine is coming through. Therefore, each individual well has to be analyzed if paraffin troubles are present to determine just when and how the paraffin treatment should be given in relation to the acid treatment.

Fallacies in Arguments of Gasoline-Alcohol Blends

(Continued from Page 12)

rate of 20 per cent alcohol and 80 per cent gasoline. Other gasolines and those used for agriculture are exempt. In 1930 the quantity of alcohol used in motor fuels totaled 75,000 bbls. The price of gasoline at Budapest for the first quarter of 1932 was 17.6 cents.

Italy—Although legislation was enacted to require gasoline dealers to absorb certain quantities of domestic alcohol, actual admixture was small. The original decree was modified once or twice, but scarcity of properly dehydrated alcohol and the lack of enforcement led to dissatisfaction on the part of both alcohol and gasoline dealers. Price of gasoline in the first quarter of 1932 in Rome ranged from 36 to 40 cents a gallon. At Milan the price was 33.1 cents a gallon. Latvia—A law was passed which requires that all gasoline, kerosene, benzol or other liquid fuels used for internal combustion engines, must be mixed with absolute alcohol purchased from the State Alcohol Monopoly. The proportion is 25 per cent alcohol and 75 per cent other motor fuel. Poland—Movement for a proposed law compelling the use of alcohol as a motor fuel has been inaugurated. The price of gasoline at Warsaw in the first quarter of 1932 was 34.7 cents a gallon.

Behavior of Alcohols

Lower mileage for alcohol-gasoline motor fuel was indicated in a block test made, using a Ford "A" engine operated at maximum horsepower output. Regular gasoline consumption in gallons per 100 horsepower hours at 1,500 r.p.m., was 10.45, while consumption for the same gasoline to which 10 per cent of dehydrated alcohol had been added moved up to 11.10 gallons. At 2,000 r.p.m., 10.45 gallons of regular gasoline were consumed, while 10.68 gallons of the 10 per cent alcohol mixture were used. In 1921, H. R. Ricardo published data which the passage of a decade can scarcely modify. Ricardo compared alcohol and gasoline as motor fuels in the following terms: Gasoline, 0.782 specific gravity, latent heat at constant pressure (atmospheric), B.t.u./lb., 142; corrected "lower" calorific value, B.t.u./lb., 19,250; minimum consumption at 5:1 compression, pound per initial horsepower hour, 0.425; corrected thermal efficiency per cent, 31.9; minimum consumption at highest useful compression, pound per initial horsepower hour, 0.435. Alcohol, 0.815 specific gravity, latent heat, 442 B.t.u./lb.; corrected "lower" calorific value, 11,130 B.t.u./lb.; minimum consumption, 5:1 compression, pound per initial horsepower hour, 0.705; corrected thermal efficiency, 32.5 per cent; minimum consumption at highest useful compression, pound per initial horsepower hour, 0.565.

Extracting Alcohol from Motor Fuel

The accompanying tables present data showing the physical characteristics of ethyl alcohol in gasoline in varying proportions and in the presence of normal butyl alcohol.

Ethyl alcohol per cent	Gasoline per cent	Alcohol per cent	Miscibility temp. °F.
95	95 Crack.	5	20
	90 Crack.	10	16
	85 Crack.	15	8
	80 Crack.	20	0
	75 Crack.	25	—6
	95 S.R.	5	32
	90 S.R.	10	35
	85 S.R.	15	32
	80 S.R.	20	24
	75 S.R.	25	24
96.5	95 Crack.	5	80
	90 Crack.	10	85
	85 Crack.	15	74
	80 Crack.	20	66
	75 Crack.	25	58
	95 S.R.	5	96
	90 S.R.	10	98
	85 S.R.	15	95
	80 S.R.	20	86
	75 S.R.	25	79
95	99 Crack.	1	(*)
	98 Crack.	2	(*)
	95 Crack.	5	(*)
	90 Crack.	10	(*)
	85 Crack.	15	(*)
	99 S.R.	1	(*)
	98 S.R.	2	(*)
	95 S.R.	5	(*)
	90 S.R.	10	(*)
	85 S.R.	15	(*)

Note—All percentages by volume. *Not miscible up to 136° F.

The miscibility temperature is somewhat lowered by the addition of a percentage of butyl alcohol to the ethyl alcohol. The gasoline used in obtaining data for the following table was a straightrun gasoline from Oklahoma crude oil. Two ethyl alcohols were used, the 95 per cent and the 97.5 per cent grades. Miscibility temperatures are shown for additions of 10 per cent ethyl alcohol (95 per cent) containing various percentages of butyl alcohol:

	Butyl per cent in ethyl	Miscibility temp. °F.
	10	103
	20	77
	35	2
	50	—55
(97.5%)	10	24
	20	—8
	50	Below —70

The following tables show the volumes of ethyl and butyl alcohol separated from the gasoline by successive additions of water at various temperatures. The figure for volume extracted, obviously, includes the quantity of water added each time:

Sample	95% ethyl alcohol		98% ethyl alcohol			
Gasoline	97.8	90	97.8	90	98	97.8
Ethyl alcohol	2.0	10	2.0	10	2	2.0
Butyl alcohol	0.2	4	0.2	0	..	0.2

Volume separated by successive 2 cc. water added at room temp.		2 cc. water—room temp.		Volume separated by 1 cc. added 60° F.	32° F.
*2.0	10	3.0	10	1.9	2.1
*2.4	5	2.4	4		
*2.0	4	2.0	3		
	2.6				

*At 104° which was miscibility temperature of original mix.

Hearing on Increasing of Conroe Allowable

(Continued from Page 9)

though wells could be produced at considerably higher rates than at present, the gas cap above is the most important thing to be considered and this gas would be dissipated if production were not uniform and the rise of the water table even.

Conservation of the gas and the pressures in the gas cap was stressed and witnesses pointed out that it was common practice of most operators to blank this gas zone off entirely to produce wells from the oil-saturated zone exclusively. By this practice, the gas-oil ratio of wells is reduced to around 400 feet per barrel, while wells which have taken in' even a small portion of the gas cap have had ratios as high as 4,000 feet per barrel.

Due to the permeability of the sand and the low viscosity of the oil, the oil drains freely from the reservoir and at high rates of flow there are sharp drops in bottom hole pressures. Pressures in the field were indicated as having dropped from 2,275 pounds to around 2,180 pounds at present. Because of this condition, a single well drains a wide area and a high rate of flow in any individual well is readily felt in wells located some distance away. It was stated that one well could drain satisfactorily as much as 35 to 40 acres and it was recommended that the present spacing of one well be strictly enforced, not only as a means of conservation of unnecessary drilling expense but also because of fire hazards, which are more acute in Conroe than usual. It was pointed out that there had been a tendency to grant well permits on small tracts instead of pooling these tracts as is provided by Railroad Commission orders, and that if the 20-acre spacing regulations were broken down and a 10-acre spacing adopted, companies with large tracts and which have adhered to the regulations so far would have wasted 10 per cent of their wells already drilled.

Readiness of Production

The readiness with which the Conroe sands produced was illustrated by the condition which has developed around the Madeley lease of the Standard Oil Co. of Kansas in the Ransom House Survey. The Standard's No. 1 Madeley blew out, cratered, and caught fire and the gas quickly charged shallow water sands and found its way in short time to wells as far as 1,000 feet distant, causing Standard's No. 2 Madeley, a drilling well, to blow out, and the cratering and loss of Harrison & Abercrombie's No. 1 Alexander and the cratering of two drilling wells of Humble Oil & Refining Co. and several shallow water wells. The cratering still is going on and a series of wells now are being necessitated to relieve the pressure in the shallow sands. The Standard's fires and the cratering situation also has brought home the hazard of any closer spacing than one well to 20 acres, as was testified by J. S. Abercrombie, one of whose leases offsets the Madeley lease to the north.

Separate Sand

E. E. Fogelson, attorney for the South Gulf Oil Corp., which recently completed the second of two wells which have been completed down flank in the oil pay of the upper horizon which produces only gas over the main part of the Conroe Field and which is not being developed there, petitioned the railroad commission that his company's well be not included in the general Conroe proration program. He stated that this upper sand constituted a separate field in which only two wells had been completed and that these had no connection with the Conroe Field as producing from the "Conroe sand" and that the railroad commission was without authority, as stated in the state law, to prorate new fields until the daily production had reached a figure of 10,000 bbls. Mr. Parker, who heard the testimony in behalf of the commission, stated the commission would take the matter under consideration.

The sand in which the South Gulf Oil Corp.'s well, and also Gulf Coast Drilling & Production Co.'s No. 1 Keystone Mills, is producing previously was described by witnesses in the hearing as being an entirely separate sand body overlying the area some 200 feet above the main Conroe sand and cut off by impervious shales. This sand has carried only gas and only recently have the two wells, both located well down the flank, found production in the sand. The locations of these wells were pictured as being beyond the limits of production of the main Conroe sand and overlying the water. The productive area of the sand was estimated at around 1,200 acres with a possible recovery of 9,000,000 bbls., not included in previous estimates of Conroe potential recoveries. The sand is approximately 15 feet in thickness and has a slightly less porosity than the main Conroe sand, witnesses testified.

Witnesses included F. W. Michaux, resident geologist for the Humble Oil & Refining Co. at Conroe; W. W. Scott, chief petroleum engineer for the Humble Oil & Refining Co.; J. S. Abercrombie, of Harrison & Abercrombie, Conroe operators; and Fred C. Sealey, assistant general manager of production, Gulf Coast division, The Texas Company.

Drilling Regulations

At the hearing operators presented a request that the railroad commission modify certain of its recent regulations pertaining to drilling practices. The recommendations were those of a committee of engineers and operators representing 17 companies and independents with holdings aggregating approximately 90 per cent of the field. The most important change asked was in the recent order requiring the setting of three strings of pipe in all wells. The order was put into effect following the recent blowouts on Standard of Kansas' Madeley lease in which shallows sands became charged, and provided that the first string be set at about 350 feet, the second around 1,400 feet and the third as had been the practice on the sand. It was the belief of operators that three strings were necessary only in the immediate area of the Standard lease and that elsewhere two strings were adequate, the surface string to be run to 1,200 feet and which, if properly cemented, would provide sufficient protection.

Less stringent regulations governing the testing of casing and the type of blowout preventers and the length of time cement must set under pressure were suggested. It was stated the regulations could be made less stringent without sacrificing safety and at the same time would mean an important saving in costs of operations. Modification of well spacing regulations to permit location of wells in the center of 20-acre units without the required present spacing of a well being not less than 466 feet from a line and not less than 933 feet from another well. This, it was said, would take care of irregular 20-acre units.

The Conroe hearing was interrupted for an hour for a special hearing for operators of the Saxet Field who were asking an increase in the gas-oil ratio allowance for wells in the field and who also were protesting against the commission's orders requiring all wells to be equipped with orifice meters. F. T. Burgess, superintendent of the Morgan-Texas Co., testified that it was impossible for most wells in the field to produce at the ratio of 2,000 feet of gas per barrel of oil. E. V. Foran, engineer employed to make a survey of production conditions in the field, stated that the gas-oil ratio in the field was inherently high and not the result of bad practices on the part of the operators and thus should not be the main factor in governing proration regulations. He explained that the fluid content of the reservoir was comparatively slight and that high production of gas, if there were a market for that product, would not be wasteful.

Many Injunctions Granted in East Texas District; New Locations and Completions Decline

By L. E. BREDBERG

DALLAS, Tex., Feb. 20.—Drilling continues to decline in the East Texas Field, the recent order of the Railroad Commission allowing one well to be drilled to each 10 acres instead of one well to every 20 acres as in the past, having no effect on drilling. The operators ignored the old rule and drilled when and where they saw fit, getting permits they desired whether on large tracks or small, until the ratio for the smaller operators ran one well to every eight acres, the average for the field being one well to every 11 acres. Permits were apparently easy to obtain, regardless of the old rule, and the heavy drilling in the field was completed before the new rule was issued.

Locations and Completions

There were only 21 locations staked this week, the lowest number staked in two years. Only 36 producers were completed, 15 less than the previous week. The low price for crude, and lack of cash, with the present uncertainty have all combined to check drilling. Oil payments for drilling are not as popular as they have been, for the contractors figure they cannot make any money by taking oil payments, being unable to get rid of only a few barrels per day under the present allowable, and the price down to 50 cents with a possibility of going still lower.

Injunction Against Pipe Line

On February 14 Judge W. F. Robertson granted the State an injunction permitting representatives of the Railroad Commission to inspect books and records of the Atlas Pipe Line Co. which has had a restraining order preventing the commission from entering its properties to gauge tanks or check pipe line runs, or examine records. The company made application for an injunction to stay prosecution of a Travis County District Court's restraining order, but was not upheld by Federal District Judge James C. Wilson of Fort Worth. The commission is now gauging the tanks and checking the records.

Restraining Orders Granted

The Travis County Court has been busy issuing injunctions against violators of the commission's order, and another batch of restraining orders were issued this week preventing certain operators from overproducing their properties. Some of these orders were issued against producers who have not overproduced heretofore, but have intimated that they would open their wells if offset operators who have been violating the commission's order would not stop overproducing.

Judge William H. Atwell of Dallas refused the Burton Drilling Co. of that city, a temporary injunction restraining the Railroad Commission from interfering with producing its properties, but the judge promised to give the company a hearing before a three-judge court at Dallas on March 10 if the decision now pending as result of last month's trial at Houston fails to take into consideration all points raised by the company. The company is now restrained from violating orders of the commission.

Railroads Get Injunction

An order issued by the commission on February 15 struck at carriers who might seek to transport oil whether or not it was legally produced. This order restrained pipe lines and gathering systems from transporting oil from any lease or wells to which they may be connected after such pipe line company has been notified in writing by the commission that the owner or operator of the well or lease has violated any rule or regulation of the commission or any conservation law of the State with reference to oil or gas. The commission will notify the pipe line company of the violation.

Almost as soon as the Railroad Commission issued the order prohibiting carriers from accepting crude for transport unless accompanied by a tender approved by the commission, and prohibiting the spotting of tank cars by railroads at oil loading racks, sidings, or other points where oil is being loaded unless a tender has been approved by the commission showing the source of the oil, Federal Judge R. J. McMillan of San Antonio granted a 10-day restraining order to the railroads operating in the district to prevent the commission from enforcing its order applying to those carriers. The restraining order will be extended if necessary until a three-judge Federal court can hear the railroads' application for an injunction.

The commission's order was aimed at many thousands of barrels alleged illegally produced oil declared to be going out of the district by tank cars. Commission men gauge storage tanks, meters are on some, if not all, of the pipe lines, and commission men check up the majority of the local refineries, but heretofore have had little check on railroad shipments. Oil is hauled to some loading racks by trucks.

The carriers represented that they are willing to co-operate in proration, but stated that the order would interfere with interstate commerce, and if it was obeyed would subject them to Federal penalties.

Price Adjustments

The Toronto Pipe Line Co., which has been paying the "going price" in East Texas, has posted a price of 50 cents per barrel for crude, the regular posting. The posting may be judged by the optimistic as an indication that proration is "tightening" and that crude is difficult to obtain at the purchaser's price. It may be a forerunner of a higher posted price by major purchasers.

The Sinclair Prairie Oil Co. has made announcement that it will pay the current posted price for all "back allowable" oil held in storage on leases. A provision stipulates that the owner and producer must prove that the oil was produced in compliance with orders of the Railroad Commission.

Wildcatting Activity

Shell Petroleum Corp. and others' No. 1 Phillips in the Swayze Survey, Leon County, continues to core ahead, but so far has encountered no further showings of oil or gas. A late report from the field stated it was coring at 6,275 feet. It now appears to be "entirely out of the picture" so far as oil production is concerned.

The Brownsboro Oil Corp.'s No. 1 J. T. Debman in the J. N. Sullivan Survey, near Brownsboro in Henderson County, and near H. H. Myers and others' test on the Olson farm in the George Wilson Survey, has been abandoned at a total depth of 4,130 feet. The latter test is shut down at 3,905 feet with no showings of oil or gas. This test was reported to have cored saturated sand but never was proven as a producer.

McElreath and Suggett, operators of Fort Worth, will drill a Woodbine sand test on a large block of acreage near Murchison in Henderson County. Major companies have been taking leases on the borders of the block, while royalty buying by companies and independents alike has been active.

Whether or not proration has tightened up in the field is difficult to conjecture, for where one by-pass or overproducer has been caught and a well shut in, and an injunction obtained to prevent overproducing property, probably still others are installing by-passes or are just starting to overproduce their properties sometimes because of offset wells producing.

Hearing at Austin Set

The commission has called a hearing at Austin on February 23. Many are of the opinion that the allowable may be raised for the field, but with purchasers electing to take less oil, and some seeking a greater outlet for the Conroe Field, it is difficult to see the reason for such an increase. Methods of allocating production and possibly a revision of purchasers' nominations will be discussed at the hearing.

Commission field men dug up by-passes on two more wells this week, and an injunction was secured against the producer to restrain him from overproducing. Another producer having 13 wells in the southern part of the field was charged with overproducing and an injunction secured against him to prevent further overproducing. However, these injunctions may only stop the few producers upon whom they are imposed.

Distribution Report

There are now over 9,700 producing wells in the field, and distribution reports showed main lines running a daily average of slightly over 311,000 bbls. for the week ending February 13, runs to refineries totaling 36,790 bbls. per day and tank car shipments averaging 30,850 bbls. per day, tank car shipments showing an increase each week. For the week ending February 2 tank car shipments registered only 14,890 bbls. per day, giving an idea of how tank car shipments have increased during the past two or three weeks.

The amount of oil run in excess of reported production is estimated at from 75,000 to 80,000 bbls. per day.

COMPLETIONS IN EAST TEXAS

North Gregg County

A. P. Carr's No. 2 Richey, top sand 3,518 feet, initial production 35 bbls. in 15 minutes through open tubing, total depth 3,543 feet (formerly carried as No. 3). Gulf Production Co.'s No. 34 J. C. Judge, top sand 3,496 feet, initial production 80 bbls. per hour through three-quarters-inch tubing choke, total depth 3,524 feet. Humble Oil & Refining Co.'s No. 19 W. R. Hughes, top sand 3,632 feet, initial production 17 bbls. in 15 minutes through three-quarters-inch choke, total depth 3,661 feet; No. 10 H. M. Lawrence, top sand 3,579 feet, initial production 72 bbls. per hour through three-quarters-inch tubing choke, total depth 3,622 feet. B. K. Isaacs, trustee's No. 1-B T. B. Harris, top sand 3,515 feet, initial production 25 bbls. in 25 minutes through five-eighths-inch tubing choke, total depth 3,545 feet. J. H. Massie and others' No. 5 Molley Fenn, initial production 30 bbls. in 30 minutes through open tubing, total depth 3,662 feet. Ray Drilling Co.'s No. 5 L. H. Tubbs, top sand 3,566 feet, initial production 15 bbls. in 30 minutes through open tubing, total depth 3,607 feet. The Texas Company's No. 13 T. W. Lee, top sand 3,537 feet, initial production 109 bbls. per hour through 1-inch tubing choke, total depth 3,569 feet.

South Gregg County

Arkansas Drilling Co.'s No. 4 H. Adkins, top sand 3,651 feet, initial production 35 bbls. per hour through 1-inch open tubing, total depth 3,659 feet. Burke Royalty Co.'s No. 1 S. Carr, top sand 3,498 feet, initial production 64 bbls. per hour through open tubing, total depth 3,530 feet. Galvez Oil Corp.'s No. 2 M. Strong, top sand 3,743 feet, initial production 50 bbls. per hour through three-quarters-inch tubing choke, total depth 3,744 feet. Gulf Production Co.'s No. 21 A. Spear, top sand 3,531 feet, initial production 75 bbls. per hour through

New Pumping Power in Lathrop Pool of East Texas

Lufkin crank type Timken bearing unit powered by a 100 h.p. Waukesha gas engine on the Sun Oil Co.'s Ramey lease. This is the fourth pumping power installed by this company

three-quarters-inch tubing choke, total depth 3,547 feet. Sinclair Prairie Oil Co.'s No. 30-B A. A. King, top sand 3,450 feet, initial production 30 bbls. in 10 minutes through open tubing, total depth 3,470 feet.

North Rusk County

Gulf Production Co.'s No. 9-B C. E. Christian, top sand 3,661 feet, initial production 75 bbls. per hour through three-quarters-inch tubing choke, total depth 3,667 feet; No. 6 Rosa Russell, top sand 3,557 feet, initial production 90 bbls. per hour through three-quarters-inch tubing choke, total depth 3,592 feet. Horseshoe Syndicate's No. 2 W. P. Brightwell, top sand 3,674 feet, initial production 70 bbls. in 30 minutes through open tubing, total depth 3,684 feet. Humble Oil & Refining Co.'s No. 70 Crim, top sand 3,584 feet, initial production 35 bbls. per hour through three-quarters-inch tubing choke, total depth 3,594 feet; No. 90 L. D. Crim, top sand 3,590 feet, initial production 45 bbls. per hour through three-quarters-inch tubing choke, total depth 3,600 feet.

South Rusk County

American Liberty Oil Co.'s No. 1-D Strickland (formerly carried as No. 4-D), top sand 3,608 feet, initial production 30 bbls. per hour through open 2½-inch tubing, total depth 3,627 feet. Deland Oil Co.'s No. 1 Neal Cooper (formerly carried as W. W. Chaves), top sand 3,543 feet, initial production 25 bbls. in 12 hours on pump, total depth 3,640 feet. Humble Oil & Refining Co.'s No. 6 O. Blackwell, abandoned location; No. 5 J. D. Florey, top sand 3,698 feet, initial production 75 bbls. per hour through three-quarters-inch choke, total depth 3,722 feet; No. 4 S. A. Glover, top sand 3,696 feet, initial production 28 bbls. per day, will not flow, total depth 3,761 feet; No. 4 L. R. Lindsey, top sand 3,710 feet, initial production 50 bbls. in 30 minutes through three-quarters-inch choke, total depth 3,788 feet; No. 2 M. A. Neal, top sand 3,640 feet, initial production 28 bbls. per day swabbing, total depth 3,730 feet; No. 2 Clayton Young, top sand 3,670 feet, initial production 93 bbls. per hour through three-quarters-inch choke, total depth 3,690 feet.

Magnolia Petroleum Co.'s No. 3 S. W. Moore, top sand 3,640 feet, initial production 21 bbls. in 10 minutes through 1-inch choke, total depth 3,685 feet. Mid-Kansas Oil & Gas Co.'s No. 10 Kangerga, top sand 3,652 feet, initial production 66 bbls. per hour through open 2-inch lead, total depth 3,661 feet; No. 5 Jim Lumsford, top sand 3,631 feet, initial production 66 bbls. per hour on 3-inch lead, total depth 3,702 feet. The Texas Company's No. 14 W. W. Henry, top sand 3,668 feet, initial production 103 bbls. per hour through open 2-inch tubing, total depth 3,674 feet. Ward Oil Co.'s No. 6 Giles, top sand 3,683 feet, initial production 45 bbls. per hour through open 2-inch tubing, total depth 3,790 feet.

Smith County

Florence Oil Co.'s No. 1 Cole (formerly W. E. Skinner), top sand 3,774 feet, initial production 30 bbls. in 15 minutes through three-quarters inch choke, total depth 3,777 feet. Summit Drilling Co.'s No. 9 Mayfield, top sand 3,818 feet, initial production 150 bbls. in 30 minutes through open 2½-inch tubing, total depth 3,824 feet.

Upshur County

H. W. Elliott and others' No. 2 W. H. Reid, top sand 3,704 feet, initial production 45 bbls. per hour through open tubing, total depth 3,714 feet. Humble Oil & Refining Co.'s No. 4 E. W. Smith, top sand 3,636 feet, initial production 10 bbls. in 15 minutes through three-quarters inch tubing choke, total depth 3,663 feet; No. 17 J. D. Smith, top sand 3,656 feet, initial production 70 bbls. per hour through three-quarters inch tubing choke, total depth 3,666 feet.

EAST TEXAS WILDCAT COMPLETIONS

Bowie County

Roy Anderson and others' No. 1 Breckenridge, top Pecan Gap 1,362 feet, base 1,805 feet, top Austin chalk 2,320 feet, drill stem test from 2,248-53 feet, open 20 minutes made 3 thribles salt water, drill stem test 3,033-43 feet, open 10 minutes made 800 feet salt water, dry and abandoned, total depth 3,035 feet.

Van Zandt County

Pure Oil Co.'s No. 4 B. W. Russell, top Pecan Gap 1,910 feet, base 2,040 feet, top Austin chalk 2,575 feet, base 2,774 feet, top sand 2,889 feet, initial production 63 bbls. oil in 24 hours pumping, total depth 2,966 feet.

East Central Texas Wildcats

Week Ending February 20

ANDERSON COUNTY

Company, well, farm name, section and block—	Remarks
Barclay et al's No. 1 J. C. Beard, 150 ft. out of most westerly NE cor. of 178-ac. lease, J. Trimmer Sur.	S.D. 1,518 ft.
C. R. Wilmuth et al's No. 1 N. B. Watson, 500 ft. from W line and 4,850 ft. from N of S line of survey in 8½ of 139-ac. tract, M. Main Sur.	T.D. 1,538 ft.

ANGELINA COUNTY

Crosbie et al's No. 1 John C. Davis, 150 ft. from N of center of tract and survey, John H. Graham Sur.	S.D. 960 ft.; sandy shale; show oil.
W. J. Chandler's No. 1 L. J. Dearman, 350 ft. from S and W lines of 20-ac. tract, J. T. Peavy Sur.	S.D. 1,680 ft.
H. C. Jennings et al's No. 1 Colmorgan, 150 ft. from N line and 1,300 ft. from E line of 200-ac. tract, 4 miles N of Lufkin, J. Messingill Sur.	Rigging up.

BOWIE COUNTY

Tom Bell et al's No. 1 C. M. Moss, 1,800 ft. from N line and 2,150 ft. from W line of 465-ac. tract and survey, O. D. Walton Sur.	S.D. 1,800 ft.

CHEROKEE COUNTY

Barkley Tate et al's No. 1 H. E. Neal, 330 ft. from N and W lines of tract, J. M. Prosella Sur.	Derrick.
Hooper et al's No. 1 Doctor Overton, 330 ft. from N and E lines of tract and 330 ft. out of most easterly NE cor. of survey, Wesley Dikes Sur.	Drill stem test 3,625-56 ft.; made 17 fourbles oil, 3 fourbles mud in 13 min.; T.D. 3,665 ft.; swabbed; goes dead; making some salt water; running tubing with packer.
L. J. Hopcroft et al's No. 1 J. R. Taylor, 2,600 ft. from E line and 2,000 ft. from S line of survey, G. M. Doherty Sur.	Location
Loring Oil Co.'s No. 1 F. M. Swearingen, 330 ft. from S and E lines of 68-ac. tract, 2,300 ft. from W line and 330 ft. from S line of survey, Oliver Lund Sur., 1 mile SW of Maydelle	T.D. 5,005 ft.; red shale; fishing rig.
Mid-Tex Oil Co.'s No. 1 A. Pace (formerly Clopton), 288 ft. from N line and 330 ft. from most northerly E line of 40-ac. lease, Wesley Dikes Sur.	T.D. 3,665 ft.; preparing to swab: top sand 3,662 ft.
Wilson & Stubbs' No. 1 L. Robert, 450 ft. from S and 150 ft. from W line of lease, J. B. Wolfin Sur.	Prepare to deepen; T.D. 3,600 ft.

DELTA COUNTY

Commerce Oil Co.'s No. 1 Ablowich, 150 ft. from S line and 776 ft. from W line of H. D. Jewett 52-ac. tract, E. Chick Sur.	S.D. 2,619 ft.

ELLIS COUNTY

Armstrong Bros.' No. 1 Reeves	S.D. 300 ft.
Armstrong Bros.' No. 1 John Lee Winn, 1,650 ft. from E and 150 ft. from S of Orland, Orlo Wheeler Sur.	S.D. 1,435 ft.
George Beasley's No. 1 Francis Borck, 850 ft. from SW line and 350 ft. from S and E lines of tract and grant, 11 League grant	Rig up.
Clark Brooks' No. 1 Anderson, SE cor. of 3,900-ac. tract, 10 miles SW of Waxachachie, E. C. Branch Sur.	S.D. 1,050 ft.
Paris Oil Co.'s No. 1 O. S. Bain, 1,500 ft. from S line and 300 ft. from W line of 60-ac. lease, R. M Williams Sur.	S.D. 985 ft.

FANNIN COUNTY

Lauther Kenn et al's No. 1 Steren, center of survey, 3 miles SW of Ladonia, John Wills Sur.	Top Pecan Gap 440 ft.; S.D. 625 ft.; chalk.

FRANKLIN COUNTY

Whiteoak Oil Co.'s No. 1 O. C. Clanton, 750 ft. from S line of survey and 150 ft. from W line of survey, S. McCreary Sur.	Rigging up.

FREESTONE COUNTY

Clyde Creighton's No. 1 Holley Bros., 854 ft. from W line and center of N and S lines of lease, A.B.M. Sur.	Drlg. 4,130 ft. in Austin chalk.

GREGG COUNTY

Bay Oil Corp.'s No. 5 J. M. Wheeler, 150 ft. due N of Pulphrey Bros.' No. 1 Wheeler, D. Ferguson Sur.	Derrick.
Daniels & Sheppard's No. 1 W. P. Crews, N offset to Boggett & Bayer's No. 1 Herions of Jerico, J. W. Bradshaw Sur.	T.D. 3,731 ft.; top sand 3,729 ft.; swabbing.
Darby Petroleum Co.'s No. 6 W. H. Ritchie, E offset to A. P. Carr's No. 2 Ritchie, H. Edwards Sur.	Waiting on cmt.
Dearing & Sons' No. 1 Baptist Church Cemetery, 237 ft. from S and 193 ft. from E lines of lease in W. H. Castleberry Sur.	Location.
Joe Edgar et al's No. 2 Stinchcomb, 75 ft. N and 36.4 ft. W of most northerly SW cor. of Stanolind's Key lease, W. H. Hart Sur.	Moving in.
H. & F. Oil Co.'s No. 2 M. Jackson, 330 ft. from S line and center of E and W lines of 16.66-ac. lease, G. F. Penn Sur.	Derrick.
Faith Oil Co.'s No. 4 J. C. Barrett, B. W. Witcher Sur.	Rig up and S.D.
S. A. Gaskill's No. 2 Godfrey, SW offset to Waggoner & McConnell's No. 1 Smith in Blk. 82, M. Dillard Sur.	T.D. 3,610 ft.; lost hole; skidded 20 ft. NE
Lewis Godlin's No. 1 E. L. Walker, 330 ft. N of road, 330 ft. from E line of 40.2-ac. tract, M. Dillard Sur.	Derrick
P. L. Hoffman's No. 3 Phillips, 330 ft. from W line and center of N and S lines of lease, D. Ferguson Sur.	Rig up
Humble Oil & Refining Co.'s No. 4 W. C. Mackey, 300 ft. from N and 330 ft. from W lines of lease, H. F. Rodgers Sur.	T.D. 3,633 ft.; waiting on cmt.
H. M. Jones' No. 1 L. D. Crim, 330 ft. from N line and center of E and W lines of 10-ac. tract, M V. Winkle Sur.	T.D. 3,650 ft.; shot 80 qts. 3,544-60 ft.; cleaning out.
Edwin Lacy's No. 2 fee, center of 1¼-ac. tract, M. V. Winkle Sur.	Location
Jack T. Life's No. 1 B. Moore, center of 1.75-ac. lease, D. Moore Sur.	Drlg. 700 ft.; shale.
Lion Oil & Refining Co.'s No. 2 Evans, S offset to Sinclair Prairie's No. 10 Williams, P. McAnnelly Sur.	Derrick.
Magnolia Petroleum Co.'s No. 3 J. H. Beavers, 219 ft. from N line and 372 ft. from E line of lease, T. R. Rains Sur.	Location
Magnolia Petroleum Co.'s No. 4 C. Jones, 330 ft. from N and W lines of lease, G. W. Hooper Sur.	Derrick.
Manda Oil Co.'s No. 1 J. A. King, 330 ft. from S and 89 ft. from E lines of lease, W. P. Chisum Sur.	Drlg. 3,255 ft.
J. C. Means' No. 4 W. D. Luce, SW offset to Blue Star's No. 3-G, E. L. Walker Sur.	Rig up.
Midfield Oil Co.'s No. 2 Sample, 300 ft. S of East	

(Continued on Page 60)

New Mexico Bulletin on Oil and Gas Resources

Since the development of the Hobbs Field, Lea County, New Mexico, there has been an ever increasing interest in the oil and gas resources of that State. In the fall of 1930 the State Bureau of Mines and Minerals Resources of the New Mexico School of Mines decided to assemble the available information relating to oil and gas in the State and this work was assigned to Dean E. Winchester, consulting oil geologist of Denver, Colo., and formerly geologist of the U. S. Geological Survey.

The result has just been completed and published as Bulletin No. 9, "The Oil and Gas Resources of New Mexico," and consists of 225 pages and 33 plates and 11 figures. Many questions have been asked about the oil and gas possibilities of that State and this bulletin will give the answer to the great majority of them. These data have been secured by the study of the logs of about 1,400 wells with a combined footage of more than 3,000,000 feet drilled for oil. Copies of this bulletin may be obtained for $1.50 from the State Bureau of Mines and Mineral Resources, New Mexico School of Mines, Socorro, N. Mex.

FOR NEW TEXAS COMMISSION

AUSTIN, Tex., Feb. 20.—A bill to strip the Texas Railroad Commission of supervision of oil and gas production and transportation and to create a new natural resource commission of three appointive members to take over the duties was approved, 10 to 5 by a house committee Monday, sending the bill to the house for a vote.

A tax of one-fourth of 1 cent per barrel would be levied on oil producers to bear the expense of the commission. The commission would be composed of three members to be appointed by the governor.

ROCKY MOUNTAIN RUNS

Average daily pipe line runs from fields in the Rocky Mountain territory for the week ending February 11 follow:

	Bbls.
WYOMING	
Salt Creek	20,260
Big Muddy	1,950
Badger Basin	50
Dallas-Derby	560
Dutton Creek	70
Elk Basin	490
Ferris	20
Frannie	640
Grass Creek	1,500
Hamilton Dome	360
Hudson	370
LaBarge	810
Lance Creek	0
Lost Soldier	1,670
Midway	100
Oregon Basin	200
Osage	810
Pilot Butte	30
Rock River	1,410
Poison Spider	60
Teapot	20
Total Wyoming	31,380
MONTANA	
Buckley-Border	390
Cat Creek	770
Cut Bank	260
Dry Creek	20
Kevin-Sunburst	3,120
Lake Basin	50
Pondera	950
Total Montana	5,560
COLORADO	
Florence	260
Fort Collins and Wellington	670
Iles Dome	490
Moffat	710
Orchard	170
Rangely	90
Tow Creek	260
Total Colorado	2,650
NEW MEXICO	
Artesia	402
Caprock	935
Hogback	220
Jal	1,161
Table Mesa	60
Eunice	519
Hobbs	30,295
Lea	2,254
Texas-Pacific	96
Rattlesnake	750
Total New Mexico	36,683
Total Rocky Mountain area	76,273
Total previous week	75,301
Difference	972

Ector County Is Most Interesting in West Texas; Crockett County Test Will Be Treated

By L. E. BREDBERG

Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Feb. 20.—Stanolind Oil & Gas Co.'s No. 1 Todd, in Section 67, Block UV, G.C.&S.F. Survey, Crockett County, has been plugged back from total depth of 8,041 feet to 7,746 feet, where it will be given a treatment with acid in an effort to disintegrate the lime and make a commercial producer out of it from a saturated streak previously cored. It may be given a shot as a final resort to make a producer from the deep lime formation which produces in the Big Lake Field.

Two more deep tests in the Big Lake Field, Reagan County, are nearing the deep pay found in the Ordovician. They are Group No. 1 Oil Corp. and Continental Oil Co.'s No. 6-B University and Big Lake Oil Co.'s No. 8-C University.

The latter company's No. 181 University, on the west edge of the original field, has been given up at 2,800 feet, where it encountered heaving sand. It was scheduled to go to the regular pay found in the pool between 2,900 and 3,000 feet.

Ector County

A most interesting test is to be drilled by A. W. Cherry of Ranger, Tex., on the J. L. Johnson land, Ector County, approximately 7 miles northwest of Harrison and others' No. 1 Addis discovery well and approximately 11 miles south of the Cowden producers. It may prove whether the two producing areas may be linked by production, or at least give a good indication of same. Location is in Section 41, Block 43, Township 1s, T.&P. Survey.

Another test is reported for the same area. The Moran Drilling Co. of Wichita Falls is said to be preparing to drill in Section 12, Block 43, Township 1s, T.&P. Survey, on land assigned by the Barnsdall Oil Co. for a test. This test will be approximately 3 miles southeast of the Cowden producers and 7 miles northeast of the test of Mr. Cherry.

Another test is reported to be in the promotion stage for a block on the B. F. Blakeney lands which adjoin the proven acreage of the Cowden ranch to the west, extending to the north and south. Location may be staked in Section 28, Block 43, Township 1n, T.&P. Survey, or in Section 33. These locations are slightly over a mile west of the Stanolind Oil & Gas Co.'s discovery well in this area, No. 1 Cowden.

Stanolind Oil & Gas Co.'s No. 1 Elliott Cowden, north offset to Harrison and others' No. 1 Addis discovery well in Section 35, Block 43, Township 2s, T.&P. Survey, is now fishing for a bit lost at 3,647 feet in lime. The Addis well is bottomed at 4,061 feet and flowing 450 bbls. per day.

Landreth Production Co.'s No. 1 Holt, in Section 15, Block 43, Township 1n, T.&P. Survey, north of the Cowden producers in the northern part of Ector County, is still cleaning out. It made a head of oil on the afternoon of February 18, when swab was run in the hole.

Interest Stimulated

Going back to the Cherry and others' test in Section 41, Zoch and others drilled a dry hole 1 mile to the west of the new location. This was drilled several years ago and went to only 3,605 feet, being abandoned before it reached the lime.

With these tests scheduled for Ector County, interest will be stimulated, the county to remain the most interesting sector of the Permian Basin for the next three or four months at the least. If the Cherry test makes a producer, considerable drilling can be expected for the area lying between the Addis producer on the south and the Cowden producers on the north, irrespective of the oil having a sulphur content, being remotely situated from tidewater, and the purchasing companies seeking oil nearer to the coast as at the present time.

Odessa is the nearest town to the newly opened area, with Midland a short distance to the east on the T.&P. railroad and a macadamized highway. Several of the companies have offices in Midland, and one or two are located at the former town.

There are two major pipe lines traversing this newly exploited area; the Atlantic Pipe Line Co. has a 10-inch line running from Winkler County to its tank farm at Midland, and the Magnolia Pipe Line Co. has an 8-inch from and to the same places. The T.&P. railroad runs within 1¼ miles south of the Addis producer, from which oil is shipped out over this road to a refinery at Big Spring.

Wildcat Operations in West Texas

Week Ending February 20

Company, well, farm name, section and block—	Remarks:
BREWSTER COUNTY	
Brewster Oil Co.'s No. 1 fee, 2,640 ft. S and 2,598 ft. E of NW cor., Sec. 45, Blk. G-15, G.C.&S.F. Sur.	S.D. 1,935 ft.
E. L. Chapman's No. 1 Skinner, C SW SE Sec. 100, Blk. 2, G.C.&S.F. Sur.	S.D. 1,302 ft.
Joiner's No. 1 McIntire, 853 ft. from S and 2,390 ft. from E, Sec. 31, Blk. 352, W. J. Mitchell Sur.	T.D. 550 ft.; fishing tools.
Trans-Pecos Oil & Gas Co.'s No. 1 Jones, 930 ft. from N and 2,500 ft. from E of Sec. 18, Blk. G-15, G.C.& S.F. Sur.	S.D. 2,900 ft.
Van McPhail's No. 1 McIntyre, SE cor. Sec. 59, Blk. 352, 7 miles south Alpine	S.D. 1,750 ft.
CONCHO COUNTY	
Beasley et al's No. 1 Waring Estate, 400 ft. from N and E. Sec. 163, T.&N.O. Sur.	T.D. 3,586 ft.; pumping 5 bbls. oil per day and some water.
Mann et al's No. 1 Hartgrove, 150 ft. from N and 75 ft. from E, Sec. 6, T.&N.O. Sur.	Location.
CROCKETT COUNTY	
Chambers et al's No. 1 Hoover, 1,650 ft. N and 330 ft. from E, Sec. 1, Blk. FF, B.&B. Sur.	S.D. 2,100 ft.; tested 5 bbls. per day after shots.
Continental Oil Co.'s No. 1 Todd, 660 ft. from S and E of Sec. 23, Blk. WX, G.C.&S.F. Sur.	T.D. 2,179 ft.; 560 bbls. sulphur water 24 hrs.; preparing to plug.
Continental Oil Co.'s No. 1-B Todd, 660 ft. from N and E, Sec. 31, Blk. WX	Drlg. 1,370 ft.
Doleman & Moore's No. 1 Ferner, 2,135 ft. from N and 1,485 ft. from E of Sec. 36, Blk. 2, I.&G.N. Sur.	Spudded and S.D.
Stanolind Oil & Gas Co. et al's No. 1 Todd, 1,370 ft. from N and 1,320 ft. from E, Sec. 67, Blk. UV, G.C.&S.F. Sur.	T.D. 8,042 ft.; plugged back to 7,765 ft.; could not swab water below 1,500 ft.
Stanolind O. & G. Co.'s No. 2 Todd, 660 ft. from N and W, Sec. 28, Blk. WX	T.D. 1,461 ft.; top pay 1,460 ft.; flowed 130 bbls. oil 12 hrs.
The Texas Company's No. 1 B. B. Ingham, 330 ft. from S and 2,330 ft. from E line, Sec. 36½, I.&G.N. Sur.	Drlg. 2,100 ft.; small show gas 2,080 ft.; ½ bailer sulphur water per hour 2,080-85 ft.
J. D. Young Co.'s No. 1 Shannon, 330 ft. from N and W, Sec. 35, Blk. 1, G.C.&S.F. Sur.	S.D. 2,235 ft.
CULBERSON COUNTY	
Harris & Haun's No. 1 fee	S.D. 2,670 ft.
Miller Bros.' No. 1 fee, 1,980 ft. from N line and 660 ft. from E line of Sec. 61, Blk. 97, P.S.L. Sur.	Location.
Milton-Dorsey's No. 1 Biggs, 4,181 ft. from N and 150 ft. from E. Sec. 2, Blk. 112, P.S.L. Sur.	Location.
ECTOR COUNTY	
Cherry et al's No. 1 Johnson, 1,320 ft. from S line and 660 ft. from E line of Sec. 41, Blk. 43, Twp. 1s, T.&P. Sur.	Location.
J. M. Cooper et al's No. 1 Cowden, 2,310 ft. from S and W, Sec. 16, Blk. 43, Twp. 2s, T.&P. Sur.	Location.
L. C. Harrison et al's No. 1 Addis, 330 ft. from N and 1,320 ft. from W, Sec. 35, Blk. 43, Twp. 2s, T.&P. Sur.	T.D. 4,061 ft.; flowing 450 bbls. day.
Landreth Prod. Co.'s Holt, C SW of SE Sec. 15, Blk. 43, Twp. 1n, T.&P. Sur.	T.D. 4,627 ft. ;plugged back to 4,400 ft.; fishing; made 2 flows into pits.
Stanolind O. & G. Co.'s No. 1 Cowden, 330 ft. from S and 1,320 ft. from W, Sec. 26, Blk. 43, Twp. 2s, T.&P. Sur.	Drlg. 3,565 ft.
Thomas et al's No. 1 Edwards, 330 ft. from S, 2,310 ft. from E, Sec. 38, Blk. 43, Twp. 3s, T.&P. Sur.	T.D. 3,200 ft.
H. F. Wurts' No. 1 E. A. Ibbetson et al, 330 ft. from N and E lines of NW Sec. 16, Blk. 46, Twp. 3s, G. M. M.Br.&A. Sur.	S.D. 3,605 ft
EL PASO COUNTY	
Tri-State Oil Co.'s No. 1 Bobadella, 1,325 ft. from S and E lines Sur. 254, S.F. No. 7,247	S.D. 3,190 ft.; fishing 3,190 ft.
FISHER COUNTY	
O'Donnell's No. 1 Pardue, 330 ft. from S and E lines of N half of SW Sec. 202, B.B.B.&C. Sur.	Drlg. 1,750 ft.
Southern Oil Co.'s No. 1 Beavers, 330 ft. from W and 660 ft. from S of S half of SW Sec. 193, B.B.B.&C. Sur.	Spudded and S.D.
GARZA COUNTY	
F.H.E. Oil Co.'s No. 1 Stoker	Drlg. 2,275 ft.
Southern Oil Corp.'s No. 1 Boren, 990 ft. N, 660 ft. E. Sec. 36, Blk. 5, H.&G.N. Sur.	S.D. 1,630 ft.
GLASSCOCK COUNTY	
Lawson's No. 2-B Edwards, 330 ft. from S and W, Sec. 16, Blk. 33, Twp. 2s, T.&P. Sur.	Drlg. 2,286 ft.
Llano Oil & Dev. Co.'s No. 1 Edwards, 330 ft. S and E, Sec. 17, Blk. 33, Twp. 2s, T.&P. Sur.	T.D. 2,180 ft. (S.L.M.); preparing to drill plug.
HOWARD COUNTY	
Eppenauer et al's No. 1 Leatherwood, C of SE of NW, Sec. 25, Blk. 33, Twp. 1n, T.&P. Sur.	Moving in material

(Continued on Page 61)

WICHITA FALLS DISTRICT

W. B. Hamilton's No. 1 Graham in the Gilbreath Survey, Abstract 136, 2 miles north of Anarene, Archer County, failed to pick up the Canyon Series sand and is pulling big pipe to drill to 3,600 feet in an effort to pick up production in the Strawn horizon, from which the Lindsay well is producing in Block 75, A.T.N.C.L. Survey in the Chalk Hill Pool.

Fisher County Line

The Shell Pipe Line Co. which has a major line running from McCamey, Texas, to Oklahoma, passing through Fisher County, is constructing 5 miles of 4-inch lateral line from the Cranfill & Reynolds leases in northeastern Fisher County to connect with this main line. A hearing is to be held during the week in an effort to obtain an order allowing the producers in the field to produce their wells according to the amount of crude the pipe line company will take daily. The field has been greatly restricted for lack of sufficient pipe line outlet and demand during the past year and a half, and the producers hope to receive a much greater allowable under this new hookup. The Humble Pipe Line Co. now has a line into the area.

COMPLETIONS IN WEST TEXAS

Pecos County

Stanolind Oil & Gas Co.'s No. 2 Tippett, top pay 531 feet, initial production 15 bbls. oil daily on pump, total depth 599 feet, plugged back to 542 feet, water at total depth.

COMPLETIONS IN PANHANDLE DISTRICT

Cottle County

Merry Brothers and Perini and others' No. 1 Pursell, dry and abandoned, total depth 4,740 feet.

Gray County

R. H. Locke's No. 1 McKnight, abandoned location.

Hutchinson County

Fred Bazo's No. 1 Moore, top pay 3,028 feet, shot with 100 quarts from 3,028-64 feet, initial production 8 bbls. daily on swab, total depth 3,080 feet.

Two Tests in N.Y.-Penn. Gas Area Are Abandoned

CORNING, N. Y., Feb. 18.—Two failures were reported in the New York-Pennsylvania gas fields in the past week in review. The York Penn Co.'s No. 1 Preston, in Farmington Township, Tioga County, Pennsylvania, was abandoned. The depth was not learned, but the hole was deep enough to thoroughly test the location. The Penn Natural Gas Co.'s No. 1 Ford, in Ontario County, was abandoned at 3,409 feet.

G. K. Rogers has started drilling No. 1 N. E. French, in Middlebury Township, Tioga County, and the Cowanesque Gas Co. has started drilling its No. 1 J. N. Leonard, in Farmington Township, Tioga County.

A number of wells in Potter County close to completion in last week's reports were either shut down temporarily or still reporting progress in this week's reports.

The Columbia Gas Co. has a 600,000-foot well shut in on the Warriner farm, near Greenwood, Steuben County.

East Central Texas Wildcats

(Continued from Page 58)

Texas' No. 1 Sample, W. P. Chisum Sur. ..... T.D. 3,722 ft.; swabbing.
Pilot Oil Co.'s No. 1 Hoyt, 155 ft. due N of N line of railroad in J. Mosley Sur. ..... Location.
Raje Oil Co.'s No. 2 Barrett, 378 ft. from N line and 330 ft. from W line of lease, B. W. Witcher Sur. .. Derrick.
Reserve Pet. Co.'s No. 1 A. Godfrey, 455 ft. at right angles from most northerly S line and 324 ft. W at right angles from most southerly W line of Shell's P. B. Bates lease, M. V. Winkle Sur. ..... S.D. 3,552 ft.
Lewis Sikes' No. 6 F. E. Stencil, 330 ft. from S line and 510 ft. from most easterly W line of lease, T. Allen Sur. ..... Drlg. 1,200 ft.
Sun Oil Co.'s No. 3 A. G. Norton, 330 ft. from W line of lease and 660 ft. S of No. 2, S. Baggett Sur. .... Derrick.
L. W. Tarkington's No. 1-A Mrs. A. M. Greggston, 187 ft. N of Johnston's No. 1 Greggston and center of N and S lines of lease, M. Dillard Sur. ..... Derrick.
W. C. Turnbow's No. 2 McKinley, 135 ft. N and 420 ft. E of NE cor. of Yount Lee's Harley lease, D. Sanchez Sur. ..... Derrick.
C. W. Wilks' No. 1 S. Carr, center of 4½-ac. tract, M. McCurry Sur. ..... T.D. 3,473 ft.; waiting on cmt.
T Oil Co.'s No. 3 A. M. Kinsel, 330 ft. from E line and center of N and S lines of lease, H. Kirk Sur. .. T.D. 3,661 ft.; will not flow; waiting orders.

HENDERSON COUNTY

Brownsboro Oil Co.'s No. 1 J. T. Debman, center of N 40 acres of Debman 80-ac. tract, J. N. Salvin Sur. ..... S.D. 4,105 ft.
Dr. J. T. Kennon et al's No. 1 Rowe & Baker, 1,320 ft. from N line and 150 ft. from W line of survey and tract, Josiah T. Childress Sur. .. .. S.D. 920 ft.
H. H. Meyer's No. 1 M. E. Olson, 2 miles S of Brownsboro tract in NW cor. of survey, George Wilson Sur. ..... S.D. 3,900 ft.

HILL COUNTY

Graves & Rose's No. 1 Halderman, 150 ft. from N and E lines of 80-ac. lease, W of Mount Calm, A. C. Graves Sur. ..... Drlg. 300 ft.
Mahon et al's No. 1 McGuffey, 620 ft. from S and 150 ft. from E line of 300-ac. tract, 4 miles NE of Mount Calm, F. & N. Scrutchfield Sur. ..... T.D. 540 ft.; fishing bit.

HOPKINS COUNTY

Burgess and Simson's No. 1 First Natl. Bank, 470 ft. N and W of SE cor. D. Buie Sur., but located in the H.E.P.&P.R.R. Sur. ..... S.D. 2,155 ft.

HUNT COUNTY

A. Kolsey et al's No. 1 W. R. Berry, 450 ft. from S line and 300 ft. from E line of 139-ac. tract, J. Roads Sur. ..... Location.

KAUFMAN COUNTY

Bixy-Bentley-Brewer et al's No. 1 J. B. Hunter, 300 ft. from S line and 150 ft. from SE line of 500-ac. tract, 4 miles S of Terrell, R. Sowell Sur. ..... Rigging up.

LAMAR COUNTY

Doyle and Jondeau's No. 1 Martin, 990 ft. from N line and 330 ft. from E line of tract, Joseph Deck Sur. ..... Rig up; T.D. 3,446 ft

LEON COUNTY

Alladay et al's No. 1 W. R. Thompson, 330 ft. from N line of survey and 330 ft. from E line of 98-ac. tract, N. M. Allen Sur. ..... S.D. 2,170 ft.
Shell-Penn & Black's No. 1 W. M. Phillips ..... Coring sandy shale and lime 6,-216 ft.

LIMESTONE COUNTY

Miller Drilling Co. and Joiner's No. 1 J. A. Stephenson, 400 ft. from S line and 300 ft. from E line of lease, one-fourth mile SE of Keese, Charles Welch Sur. .... S.D. 3,140 ft.

MORRIS COUNTY

Grover Hart's No. 1 Walcott and Lott, 250 ft. from N line and 330 ft. from E line of survey, 3 miles S of Carson, B. A. Russell Sur. ..... S.D. 1,896 ft.
Joiner & Harris Drilling Co.'s No. 1 Clayton Brown, 1,825 ft. N. of most easterly SW cor. of survey, William M. Coffey Sur. ..... S.D. 1,550 ft.
Leonard's (Tucker-Fullwood) No. 1 F. M. Staggers, 460 ft. from N line and 150 ft. from E line of 65-ac. tract, J. D. Nelson Sur. ..... Fishing; T.D. 3,679 ft.

NAVARRO COUNTY

R. B. Godding et al's No. 1 Lela Kelt, 450 ft. from E line and center of N and S lines of lease, 3 miles NE of Chatfield ..... Spudding.

RED RIVER COUNTY

Ajo Oil Co.'s No. 1 Nickels & Daniels, center of S 780 acres of 1,868-ac. tract, 8 miles N of English, Hugh B. Shaw Sur. ..... Location.
Concord Oil Co.'s No. 1 J. R. Dallahunty, 500 ft. from N of Isaac Moore Sur. and 300 ft. E of E line of Robert Glass Sur. ..... T.D. 2,827 ft.; cleaning out.
L. G. Priest's No. 1 R. W. Peck, 900 ft. N and 500 ft. S of southerly SE cor. of 229-ac. tract, A. Wagley Sur. ..... S.D. 1,302 ft.

ROCKWALL COUNTY

Suennar Oil Co.'s No. 1 H. L. Lofland, center of 69-ac. tract in W. M. Bird Sur. ..... Set 10-in. csg. 120 ft.; S.D.

RUSK COUNTY

G. S. Anderson's No. 5 Frederick, 300 ft. from S line of lease and midway between Nos. 2 and 3 and N offset to Lion's No. 2 Jobe, Juan Ximenes Sur. .. Derrick.
Big Indian Oil Co.'s No. 1 Joe Lee, 172 ft. from S line and 990 ft. from W line of 34-ac. lease, Peter Tipps Sur. ..... Swabbed through tubing showed some salt water; S.D. 3,646 ft.
T. E. Castle's No. 1 R. H. Gary estate, 3,960 ft. from N line and 5,280 ft. from W line of survey, 10 miles S of Henderson, A. Latham Sur. ..... S.D. 3,312 ft.
Fair & Thompson's No. 3 Bradford, 150 ft. from N and E lines of E 16.5-ac. lease, Juan Ximenes Sur. .. Rig up.
A. P. Gary's No. 2 Redwine, center of Blk. No. 9, in Juan Ximenes Sur. ..... Location.
Griffin & Barnes' No. 1 fee, 12 ft. from S and W lines of 2-ac. tract, J. B. De Cadena Sur. .. .. Set surface csg.
Gulf Production Co.'s No. 2 H. Barton, 1,245 ft. SE along W line of lease from NW cor. of same and 330 ft. NE at right angles in Mary Cogswell Sur. .... Location.
Gulf Production Co.'s No. 3 W. A. Hindman, 270 ft. S and 123 ft. E from NW cor. of lease, W. W. Simms Sur. ..... Location.
Harris and Russell's No. 1 T. W. Harris, 330 ft. from S line and 660 ft. from W line of most southerly SW cor. of 160-ac. tract, 3 miles SW of Henderson, W. G. Davis Sur. ..... Derrick.
Hathaway et al's No. 1 Gray, J. M. McLain Sur. ..... S.D. 3,555 ft.
H. R. W. Oil Co.'s No. 3 Redwine, 150 ft. from E line and center of Payne's No. 1 Redwine, Juan Ximenes Sur. ..... Derrick.
Hudson's No. 1 Jeff Phillips, 150 ft. from N line of survey and 640 ft. from W line of 160-ac. tract, 4 miles SE of Minden, Napomucena Villarea Sur. .... S.D. 2,025 ft.; gumbo.
Humble Oil & Refining Co.'s No. 2 C. H. Hedge, 330 ft. from N and W lines of lease, J. C. Barnett Sur. ..... Derrick.
Humble Oil & Refining Co.'s No. 1 J. D. Taylor, 330 ft. from W line of lease and S offset to No. 1 Hedge ..... Derrick.
Iotex Oil Co.'s No. 3 Tom Beall, W offset to Ward Oil Co.'s No. 3 Beall, P. W. Holmes Sur. ..... Derrick.
J. Jeagen's No. 1 Needham, 330 ft. from N line of lease and 330 ft. from NE and 400 ft. from SE of survey, J. H. Chambers Sur. ..... S.D. 1,414 ft.
Jenkins Bros.' No. 1 Daisy Bradford, 150 ft. from W line of 45-ac. tract, Juan Ximenes Sur. ..... Rigging up standard tools; failed to flow when swabbed; top sand 3,520 ft.; T.D. 3,605 ft.
Jordan & Ramsey's No. 1 L. W. Prior, 330 ft. from N line and 607 ft. from E line of 53-ac. lease, Walker Pettit Sur. ..... Derrick.
John Keegan's No. 1 J. C. Strong, 300 ft. from N line and 600 ft. from W line of 67-ac. lease, 8 miles NE of Henderson, John Hallam Sur. ..... Location.
Kimble & Acre's No. 1 Frederick, 150 ft. from S line and center of E and W lines of 10-ac. lease, Juan Ximenes Sur. ..... Derrick.
Malone et al's No. 1 J. S. Williams, 330 ft. from S line and 330 ft. from SE line of lease, Jessie Crawford Sur. ..... Rigging up.
McMahon's No. 3 Joe Lee, 1,000 ft. E of No. 2 and center of N and S lines of lease, Peter Tipps Sur. .. Rigging up.
Olson Bros.' No. 5 J. T. Brown, 200 ft. from N line and 700 ft. from W line of lease, M. J. Pru Sur. .... Derrick.
Overton Refining's No. 2 Maxwell, 70 ft. S of J. E. Oliver's No. 1 G. Pool, F. Cordova Sur. ..... Waiting on cmt. to set 3,778 ft.
Paulett et al's No. 1 Ed Sparks, 350 ft. from E. 150 ft. from S of survey, L. C. Riggs Sur. ..... S.D. 1,445 ft
Ross Seward's No. 1 Burton, J. J. Y'Barbo Sur. ..... T.D. 3,387 ft.
Smith and Sikes' No. 2 W. H. Frederick, 150 ft. from S and E lines of 10-ac. lease, Juan Ximenes Sur. .... Rigging up standard tools and swabbing; T.D. 3,675 ft.
Snyder et al's No. 2 Stewart, 174 ft. NW of No. 1 and 190 ft. SE of C. L. Archer's No. 1 J. H. Stewart, John Womack Sur. ..... Derrick.
Trico Oil Co.'s No. 1 D. Bradford, 200 ft. N of highway and 150 ft. W of most westerly creek, Juan Ximenes Sur. ..... Top Pecan Gap 2,510 ft.; S.D. 2,-900 ft.
C. A. Walker's No. 1 Nealy Johnson, 330 ft. from N and E lines of 13-ac. tract, W. T. Tutt Sur. ..... S.D. 3,180 ft.

SMITH COUNTY

Long Drilling Co.'s No. 3 G. A. Turner, D. W. Campbell Sur. ..... Derrick.
A. McCutcheon's No. 2 Temple Store, 330 ft. from W line and midway between N and S lines of lease, D. Shaw Sur. ..... Derrick.
M. M. Rowan et al's No. 1 Gibbons Mfg. Co., 5,000 ft. from S line and 3,050 ft. from W line of survey .... T.D. 3,610 ft.; S.D.
Sinclair Prairie Oil Co.'s No. 5 Patterson, 330 ft. from N and W lines of lease, J. Vargas Sur. ..... Temp. abnd.; T.D. 3,753 ft.
The Texas Company's No. 7-B Jarvis, 330 ft. from W line and 1,320 ft. from N line of lease, M. D. L. S. Coy Sur. ..... Location.

TITUS COUNTY

Perry V. Cook's No. 1 M. C. Rogers, center of SW of Moore Sur. ..... T.D. 4,212 ft.

UPSHUR COUNTY

W. C. Bentley's No. 1 Brawley heirs, 630 ft. E and 170 ft. N of NW cor. of Sun's Hargraves lease, M. Mann Sur. ..... T.D. 3,127 ft.; S.D.
Clark & Cowden's No. 3 J. W. Fris, 330 ft. from most easterly E line and center of N and S lines of lease, D. Ferguson Sur. ..... T.D. 3,630 ft.; running csg.
F. A. Fuller et al's No. 1 Shattesworth, 330 ft. from S and E lines of W 50 acres of 100-ac. tract, James Dunn Sur. ..... Oil sand 3,727-45 ft.; drill stem test; showed 17 fourbles salt water in 8 min.; S.D.
Pat Hudson et al's No. 1 D. F. Smith, 330 ft. out of SE cor. of W 100 acres of the N 200 acres of the 272-ac. lease, 3 miles E and 1½ miles N of Cranfill & Reynolds' No. 1 Rash, John Denson Sur. ..... Waiting orders 3,710 ft.
Lynch & McQuaig's No. 2 Mackey, 330 ft. from E line of lease and 550 ft. N of No. 1 well in S. Harrell Sur. ..... Derrick.
Magnolia Petroleum Co.'s No. 8 N. W. Blackwell, 330 ft. from E line and 472 ft. from Nos. 1 and 3 wells, H. E. Edwards Sur. ..... Location.
Magnolia Petroleum Co.'s No. 12 Hampton, 477 ft. from CWL and 177 ft. from CNL of lease, D. Ferguson Sur. ..... T.D. 3,666 ft.; testing.
George Pace et al's No. 1 D. C. Shelton, N offset to C. L. Brown's No. 1 D. C. Shelton, William King Sur. ..... Drlg. 250 ft.
Sun Oil Co.'s No. 3 Hodnett Melton, 330 ft. from E line and 990 ft. from Nos. 1 and 2, Juan Vargas Sur. ..... S.D. 1,629 ft.
Taubel & Lyons' No. 1 W. H. Duffy, 330 ft. from N and E lines of NW 50-ac. tract, Starr Sur. ..... Top Georgetown 3,931 ft.; S.D. 3,-964 ft.
Travis & Weir's No. 1 L. P. League, 330 ft. from N line and 330 ft. from W line of N 18 acres of L. P. League Sur. ..... Rig up.
Wadley and Evans' No. 1 W. S. Jones, 330 ft. from S and E lines of 100-ac. lease, James M. Dunn Sur. .... T.D. 3,800 ft.; swabbed salt water; S.D.
Wadley & Lyons' No. 1 Hall, 150 ft. out of NW cor. of H. E. Hall 14-ac. tract, William McKey Sur. .... Temp. abnd. 3,784 ft.
Waggoner & McConnell's No. 4 Williams, 300 ft. from W line and center of N and S lines of 22-ac. lease, McKinley & Williams Sur. ..... Rigging up.
J. E. Werby's No. 3 Read, 330 ft. from S line of lease and 490 ft. W of No. 1 T. Hopkins Sur. ..... T.D. 3,631 ft.; running csg.

VAN ZANDT COUNTY

Barton et al's No. 1 C. L. Hubbard, 600 ft. out of NE cor. of Hubbard 235-ac. tract, 2¼ miles S of Canton, M. J. De Cadena Sur. ..... S.D. 3,355 ft.
Kelly O. & G. Co.'s No. 1 Lemsford, center of Lemsford tract, John Conner Sur. ..... S.D. 2,300 ft.
Killam & Chisum's No. 1 J. J. Goode, 150 ft. from N line and 375 ft. from E line of lease, 5 miles SW of Van, David Rose Sur. ..... Derrick.
Lyman et al's No. 1 J. C. Stewart, 150 ft. from N line and 650 ft. from W line of 90-ac. tract, A. McPhail Sur. ..... T.D. 2,721 ft.
Peden-Olson's No. 1 W. S. Brannon, 205 ft. from N and 160 ft. from W lines of 45-ac. tract, 2½ miles N of John Goodman Sur. ..... Prepare to test 1,350 ft.
Pure Oil Co.'s No. 5 L. A. Smith, 250 ft. S of N line and 250 ft. E of W line of lease in John Walling Sur. ..... Drlg. soft sand 2,420 ft.
Pure Oil Co.'s No. 6 I. D. Miller, 225 ft. E of W lines and 250 ft. S of N line of lease in John Walling Sur. ..... Drlg. 1,285 ft.
A. C. Rowan's No. 1 W. E. Price, 150 ft. from N line and 150 ft. from W line of 28-ac. tract, John Walling Sur. ..... S.D. 2,942 ft.
Ray Stumpff's No. 1 M. I. Riggs, 169 ft. from E line and 250 ft. from S line of tract No. 2 and 330 ft. from E line of lease, 4 miles NE of Van, William Daniel Sur. ..... Rig up and S.D.
H. C. Teague et al's No. 1 C. W. Morris, 1,000 ft. from N line and 300 ft. from E line of 160-ac. tract, 5 miles SE of Ben Wheeler, C. L. Morrison Sur. .... T.D. 3,097 ft.; S.D.
The Texas Company's No. 4 J. A. Bracken, 217 ft. W of E line and 250 ft. N of S line of lease, John Walling Sur. ..... Drlg. 1,373 ft.

Van Oil Association's No. 1 Tankersley, 200 ft. from E and 1,000 ft. from S of farm, L. Landers Sur. ..... T.D. 2,850 ft
C. O. Weir's No. 1 W. B. Tunnell, 150 ft. from N and W lines of lease, A. H. Wiley Sur. ..... T.D. 3,003 ft.

WOOD COUNTY

De Canther's No. 1 N. L. McLain, 350 ft. from N line and 642 ft. from E line of tract, Sam Brooks Sur.... S.D. 3,846 ft.
Hull & Short's No. 1 T. H. Peterson, 600 ft. from S line and 200 ft. from E line of 320-ac. tract and survey, 4 miles E of Mineola, W. B. McNutt Sur. ..... Drlg. 2,925 ft.; sandy shale.
Wood County Dev. Co.'s No. 1 Davis, approximately 180 ft. from S line of 160-ac. tract and 2½ miles S of Kantes in Sarah McDonald Sur. ..... S.D. 4,390 ft.

Wildcat Operations in West Texas

(Continued from Page 59)

P.H.E. Oil Co.'s No. 1 Dodge, 330 ft. from N and E, Sec. 15, Blk. 31, Twp. 1s, T.&P. Sur. ..... T.D. 2,867 ft.; to shoot; rigging up standard tools.
Myers et al's No. 1 Denman, 2,305 ft. from S and 2,320 ft. from E, Sec. 14, Blk. 30, Twp. 1s, T.&P. Sur. ..... Drlg. by tools 1,505 ft.
Mid-Continent Oil & Gas Co.'s No. 1 Denman, 990 ft. from S and 330 ft. from E, Sec. 10, Blk. 30, Twp. 1s, T.&P. Sur. ..... T.D. 2,813 ft; putting on pump.
Sinclair Prairie Oil Co.'s No. 4 Dodge, 960 ft. from S and 330 ft. from W, Sec. 11, Blk. 30, Twp. 2s, T.&P. Sur. ..... T.D. 2,295 ft.; preparing to run 5 3/16-in. csg.
Sinclair Prairie Oil Co.'s No. 5 Dodge, 2,310 ft. from N and 330 ft. from W, Sec. 11, Blk. 30, Twp. 1s, T.&P. Sur. ..... T.D. 545 ft.; running 12½-in. csg.
Southern Oil Corp.'s No. 1 Williams, 430 ft. from N and 330 ft. from W of S 123 acres of W half Sec. 43, Blk. 30, Twp. 1n, T.&P. Sur. ..... T.D. 750 ft.; running 12½-in. csg.

HUDSPETH COUNTY

Patillo-Welsh's No. 1 Briggs ..... S.D. 1,135 ft.; may plug.

IRION COUNTY

Bristow et al's No. 3 Nutt, 2,550 ft. N, 1,000 ft. W, Sec. 6, Gonzales County School Lands Sur. ..... S.D. 435 ft.
Straughn et al's No. 1 Kaiser, 1,930 ft. from N and 1,390 ft. from W, Sec. 69, H. Cooper Sur. ..... T.D. 1,110 ft.; underreaming csg. at 800 ft.

JONES COUNTY

Abers et al's No. 1 Burton, 150 ft. from S and 175 ft. from E of 42.4-ac. tract in G. Martinez Sur. ..... S.D. 1,005 ft.; temp. abnd.
Condor Pet. Co.'s No. 1 Holt, 1,900 ft. from S and 1,800 ft. from W, Sec. 4, Blk. 20, T.&P. Sur. ..... Location.
Dyer's No. 1 Odom, 200 ft. from S and 170 ft. from W of N 320 acres, G. Zumwait Sur. ..... Moving in tools.
Johnson's No. 1 Huddleston, 165 ft. from S and W of N half of N half of Sec. 39, Blk. 18, T.&P. Sur. ..... Drlg. 2,385 ft.
Smart & Reynold's No. 1 Reynolds, 2,500 ft. from N and 150 ft. from W, Sec. 2, W. T. Scott Sur. No. 3... Fishing 1,474 ft.
C. S. Spelling et al's No. 1 Lillie, 200 ft. from N and W Sec. 4, E. Miller Sur. No. 2 ..... S.D. 2,030 ft.
Southern Oil Co.'s No. 1 Swann, 1,000 ft. from E and 900 ft. from S. of I. Miley Sur. ..... Drlg. 2,115 ft.
Young et al's No. 1 Harrell, 150 ft. from S and E of N half of Sec. 8, O.A.L. Sur. ..... Location.

LOVING COUNTY

A. & M. Pet. Corp.'s No. 1 Wheat, 2,310 ft. SW, 990 ft. SE, Sec. 71, Blk. 1, W.&N.W. Sur. ..... Cellar.
Eppenauer Drlg. Co.'s No. 1-A Victor, 330 ft. from SW and 338 ft. from SE of NW of N half Sec. 4, Blk. 2, W.&N.W. Sur. ..... Rigging up standard tools.
Goldman et al's No. 2 Allen, 330 ft. from NW, 2,310 ft. from SW, Sec. 90, Blk. 1, W.&N.W. Sur. ..... Shut down.
Goldman et al's No. 1 Reagan-McElvain, 330 ft. from NE, 2,310 ft. from NW, Sec. 84, Blk. 1, W.&N.W. Sur. Shut down.
Lewis & Siegel's No. 1 Johnson, 330 ft. from N and 1,650 ft. from W, Sec. 6, Blk. 56, Twp. 1, T.&P. Sur.. T.D. 3,041 ft.; S.D. for 6⅝-in. csg.
Martin et al's No. 1 Wheat, 990 ft. from SW and SE, Sec. 83, Blk. 1, W.&N.W. Sur. ..... S.D. 4,097 ft.
Miller et al's No. 1 Ferguson, 990 ft. from NE of Sec. 44, Blk. 29 ..... Spudded and S.D.
Thomas' No. 1 Wheat, 2,310 ft. from NW, 990 ft. from NE, Sec. 82, Blk. 1, W.&N.W. Sur. ..... T.D. 4,050 ft.; straightening crooked hole.

PECOS COUNTY

Bennett et al's No. 1 Powell, 330 ft. from SW and SE, Sec. 76, Blk. 10, H.&G.N. Sur. ..... Material.
California Co.'s No. 2 Tippett, 475 ft. W and 1,296 ft. N from SW cor. of Sec. 2, Robinson Sur. ..... Location.
Cardinal Oil Co.'s No. 3-G Tippett, 660 ft. from S and 330 ft. from E of No. 2 Tippett, Sec. 61, Blk. 194, G.C.&S.F. Sur. ..... T.D. 302 ft.
Cardinal Oil Co.'s No. 16 E. Tippett, 5,200 ft. from S and 150 ft. from W of E half of W half Sec. 40, Blk. 194, G.C.&S.F. Sur. ..... S.D. 550 ft.
Cooper et al's No. 1 Perry, 1,980 ft. N and W, Sec. 15, Blk. C-4, G.C.&S.F. Sur. ..... S.D. 802 ft.
Corvette Oil Corp.'s No. 3 H. Monroe, 1,040 ft. from E line and 150 ft. from N line of Sec. 39, G.C.&S.F. Sur., Blk. 194 ..... Location.
Humble Oil & Ref. Co.'s No. 1 White-Baker Co., 1,320 ft. from N and E lines of Sec. 44, Blk. Z, T.C.R.R. Sur. ..... Location for Ordovician test.
Massey's No. 1 Iowa Realty Trust, 150 ft. from NE and 1,483 ft. from NW, Sec. 21, Blk. 10 H.&G.N. Sur. ... S.D. 425 ft.
McClure et al's No. 1 Pecos Valley, 330 ft. from NW line and 330 ft. from NE line of Sec. 36, Blk. 3, H.&T.C. Sur. ..... Location.
Messinger et al's No. 1 Jones, 1,200 ft. from NW, 1,290 ft. from SW, Sec. 5, Blk. 9, H.&G.N. Sur ..... S.D. 1,000 ft.
Wahlenmaier et al's No. 1 Monroe, 5,060 ft. W and 330 ft. N from SE cor. of Sec. 41, Blk. 1, I.&G.N. Sur. ... Location.
Winfield et al's No. 1 Eaton, 1,170 ft. from NE and 2,490 ft. from SE. Sec. 35, Blk. 3, H.&T.C. Sur. ..... T.D. 1,220 ft.; trying to lower 6⅝-in. csg.

PRESIDIO COUNTY

Sadler et al's No. 1 Bledsoe, 2,640 ft. from N and W Sec. 15, Blk. 354, G.C.&S.F. Sur. ..... S.D. 328 ft.

REAGAN COUNTY

Big Lake Oil Co.'s No. 1-C University ..... S.D. 9,562 ft.
Big Lake Oil Co.'s No. 8-C University, 710 ft. from S and 2,410 ft. from E, Sec. 13, Blk. 2 ..... T.D. 8,286 ft.; running 7-in. csg.
Big Lake Oil Co.'s No. 9-C University, 2,410 ft. from N and 765 ft. from E, Sec. 12, Blk. 2 ..... T.D. 4,911 ft.; cmtd. 9-in. csg. at 4,695 ft.
Big Lake Oil Co.'s No. 10-C University, 2,025 ft. from S and 375 ft. from W, Sec. 35, Blk. 9 ..... Bldg. derrick.
Big Lake Oil Co.'s No. 181 University, 1,700 ft. from S and 2,000 ft. from W, Sec. 10, Blk. 2 ..... T.D. 2,800 ft.; plugged to abandon.
Continental Oil Co.'s No. 6-B University, 765 ft. from N and 1,980 ft. from W, Sec. 36, Blk. 9 ..... T.D. 8,275 ft.; running 7-in. csg.
Continental Oil Co.'s No. 7-B University, 1,980 ft. from N and 660 ft. from W, Sec. 36, Blk. 9 ..... Drlg. 3,583 ft.
Continental Oil Co.'s No. 8-B University, 1,200 ft. from S and 1,775 ft. from W, Sec. 36, Blk. 9 ..... Drlg. 3,300 ft.
J. P. Williams et al's No. 1 Scott, 1,650 ft. from N and 330 ft. from W, Sec. 178, Blk. 1, T.&P. Sur. ..... Drlg. 508 ft.

REEVES COUNTY

Cordova Union Oil Co. et al's No. 1 Wright, 1,320 ft. from S and W, Sec. 58, Cassell's Sur. ..... Drlg. 3,587 ft.
McDorman et al's No. 1 Ray Roberts et al, 2,310 ft. from S and E lines of Sec. 32, Blk. 59, P.S.L. Sur.... S.D. 2,025 ft.

RUNNELS COUNTY

Dutton et al's No. 1 Dean, 5,475 ft. from NE and 1,045 ft. from NW in J. Heil Sur. No. 519 ..... S.O. 3,417-20 ft., S.D. 3,600 ft.
John Castor's No. 1 Hall, 330 ft. from S and W, Sec. 149, E.T.R.R. Sur. ..... Spudded.

SCHLEICHER COUNTY

Eastland Oil Co.'s No. 1 Joe Tisdale, C Sec. 29, Blk. M, G.H.&S.A. Sur. ..... T.D. 5,410 ft.; fishing at 5,350 ft.
Wesner et al's No. 1 Nicks, 2,310 ft. from N and 2,302 ft. from E of Sec. 77, Blk. LL, T.C. Sur. ..... T.D. 6,170 ft.; cmtg. cave at 4,300 ft.
George Wilson's No. 1 Page, Sec. 40, Blk. L, 1,320 ft. from N, 1,570 ft. from W, G.H.&S.A. Sur. ..... S.D. 5,052 ft.

SCURRY COUNTY

G. E. Dickman et al's No. 1 F. C. Davis, 1,000 ft. N and 1,770 ft. W of SE cor. of Sec. 275, Blk. 3, H.&T.C. Sur ..... S.D. 5,100 ft.
M. Z. Dibble et al's No. 1 Carruthers, 2,310 ft. from N and W lines of Sec. 121, Blk. 97, H.&T.C. Sur. ..... S.D. 240 ft.
W. S. Guthrie's No. 1 Clarkson, 1,320 ft. from S and W, Sec. 243, Blk. 97, H.&T.C. Sur. ..... Drlg. 2,400 ft.
Heinzleman et al's No. 1 Hood, 436 ft. from N and 489 ft. from E, Sec. 37, Blk. 3, H.&T.C. Sur. ..... T.D. 1,150 ft.; fishing U.R. lugs.
Scurry County Oil Exchange's No. 1 Earnest, 2,310 ft. from N and W, Sec. 68, Blk. 3, H.&G.N. Sur. ..... Spudded and S.D.
Seifert & Dibble's No. 1 T. M. Blackburn, 2,310 ft. from N and 2,310 ft. from W line of Sec. 153, Blk. 97, H.&T.C. Sur. ..... S.D. 4,992 ft.

STERLING COUNTY

Fullick & Johnson's No. 1 Davis, 990 ft. from S and 660 ft. from E, Sec. 7, Blk. 12, S.P. Sur. ..... T.D. 60 ft.; S.D.

TAYLOR COUNTY

Urban's No. 1 Blair, 1,500 ft. from S and 150 ft. from W of NE 198 varas Guadalupe County School Lands, Lot 21 ..... Show oil and gas 2,315-21 ft.; S.D. 2,335 ft.

TERRELL COUNTY

Big Bend Oil Co.'s No. 1 Bassett, C NW Sec. 155, Blk. D, M-K-T Sur. ..... S.D. 2,269 ft.
Briggs & McPhee's No. 1 Kerr, 1,800 ft. E and 790 ft. S of NW cor. Sec. 18, Blk. 6-D, M.K.&T. Sur. ..... S.D. 800 ft.
Keck Pecos Trust Co.'s No. 1 Hamilton, C Sec. 6, Georgetown Ry. Sur. ..... S.D. 2,150 ft.
Miller Bros.' No. 1 Allison & Burke, C NW Sec. 10, Blk. 176, T.&P. Sur. ..... S.D. 120 ft.
Mid-Kansas Oil & Gas Co.'s No. 1 Goode, 2,152 ft. from E and 330 ft. from S, Sec. 26, Blk. 161, G.C.&S.F. Sur.. S.D. 6,120 ft.
Jones et al's No. 1 Pankenham, C SE NW Sec. 43, Blk. B-2, C.C.S.D.&R.G.N.G. Sur. ..... S.D. 2,545 ft.
Sides et al's No. 1 Phelps, 2,157 ft. from N and 2,482 ft. from W, Sec. 5, G. W. Hurley Sur. ..... T.D. 3,530 ft.; S.D. for repairs.

TOM GREEN COUNTY

Belding & Dutton's No. 1 Norsworthy, 1,640 ft. from S and 587 ft. from E of John McNeese Sur. ..... S.D. 760 ft.; S.O. and gas 725 ft.
Hancock et al's No. 1 Reed, 330 ft. N and 1,670 ft. W of SW cor. of C. Schoner Sur. but in Mason & Perry Subd. No. 39 ..... Moving in material.
Mintex Oil Co.'s No. 1 Campbell Est., 446 ft. from S and 630 ft. from W of Sec. 180, Dist. No. 11, S.P. Sur. .... S.D. 1,994 ft.
Pratt & Hancock's No. 2 Lewis, 100 ft. N and 330 ft. E of most northerly SW cor. of Joshua S. Grant Sur. No. 2 ..... S.D. 300 ft.

UPTON COUNTY

Gulf Prod. Co.'s No. 102 McElroy, 1,320 ft. from S and W, Sec. 189, Blk. F, C.C.S.D.&R.G.N.G. Sur. ..... Drlg. 2,550 ft.

VAL VERDE COUNTY

Couch et al's No. 1 J. P. Yoas, 1,300 ft. from the N line and E line of Sec. 31, Blk. 1, I.&G.N. Sur. ..... S.D. 400 ft.

THE tremendous pressures and relentlessness of concentrated wear to which couplings are subject call for a wealth of extra resistance. Because of their remarkable tensile strength and high yield point, Harrisburg couplings stand up like thoroughbreds under the most gruelling punishment.

These couplings are noted for the uniformity of grain structure and maximum physical qualities throughout the metal. They are made from our own special steels and are precision-machined in our own shops. In the Harrisburg way you'll find security against grief and loss.

Tremendous Tensile Strength

Harrisburg couplings have physical qualities in excess of A. P. I. standards.

Sales Agents: W. R. McDonough Co., National Bldg., Cleveland; S. C. Mead, 160 N. LaSalle St., Chicago; Ducommun Corp., Arcade Sta., Los Angeles; Corbett Corp., Houston, Texas.

HARRISBURG PIPE & PIPE BENDING CO., Harrisburg, Pa.

SEAMLESS Oil Field HARRISBURG PRODUCTS

O. O. Owens' No. 1 Mills, Sec. 128, Blk. 1, I.&G.N. Sur., elev. 2,130 ft. ..... S.D. 6,780 ft.

WARD COUNTY

Abell Bros.' No. 2 Sloan, 990 ft. from NE and NW, Sec. 24, Blk. 5, H.&T.C. Sur. ..... Drlg. 1,470 ft.

Atlantic Oil Prod. Co.'s No. 1 Johnson, 330 ft. from NW and 2,310 ft. from NE, Sec. 9, Blk. 34, H.&T.C. Sur.... Bldg. derrick.

Atlantic Oil Prod. Co.'s No. 2 Johnson, 990 ft. from NW and 2,310 ft. from NE, Sec. 9, Blk. 34 ..... Ready to spud.

Atlantic Oil Prod. Co.'s No. 1 University, 330 ft. S and E, Sec. 3, Blk. 16 ..... T.D. 2,448 ft.; drlg. 1,425 ft.

Atlantic Oil Prod. Co.'s No. 1 Blank-Camp, 1,320 ft. from NW and SW Sec. 14, Blk. 34, H.&T.C. Sur. ... T.D. 2,780 ft.; fishing for bit.

Atlantic Oil Prod. Co.'s No. 1 Jones, 330 ft. from SW and 1,650 ft. from SE, Sec. 25, Blk. B-29, P.S.L. Sur... Drlg. 2,550 ft.; show oil and gas 2,537-42 ft.

Barnsdall Oil Co.'s No. 5 Henry, 1,650 ft. from NE and 330 ft. from SE, Sec. 28, Blk. B-29, P.S.L. Sur. ..... T.D. 2,128 ft.; 25,000,000 gas 2,114-28 ft.; shut in.

Bentley et al's No. 1 Carson, 1,650 ft. from NE and SE, Sec. 36, Blk. 5, H.&T.C. Sur. .. .. S.D. 2,240 ft.

Bradford's No. 1 Carson, 1,650 ft. from SE and 990 ft. from NE Sec. 36 ..... Drlg. 1,650 ft.

Bradford's No. 1 Beatty, 1,650 ft. from NW and 330 ft. from SW, Sec. 3, Blk. 34, H.&T.C. Sur. ..... Material on ground.

Bunds et al's No. 1 Bennett, 2,310 ft. from NW and SW Sec. 16, Blk. 34, H.&T.C. Sur. ..... T.D. 2,608 ft.; cleaning out.

Eastland Oil Co. et al's No. 1 Grimes, 445 ft. from NE and 1,320 ft. from SE Sec. 14, Blk. 34, H.&T.C. Sur... T.D. 2,480 ft.; flowing 17 bbls. per day before shot 200 qts. 2,380-2,470 ft.; no gauge.

Eastland Oil Co.'s No. 2 Grimes, 495 ft. from NE and 440 ft. from SE, Sec. 14, Blk. 34, H.&T.C. Sur. ..... **Location.**

Eastland Oil Co.'s No. 3 Weiss, 954 ft. from NW and 254 ft. from NE of Sec. 4, Blk. 34 ..... S.D. 2,385 ft.; flowing 75 bbls. per day; to tube.

Eppenauer's No. 1 Purcell, 365 ft. from SW and 1,650 ft. from SE of Sec. 17, Blk. 14, H.&T.C. Sur. ..... T.D. 2,740 ft.

Eppenauer Drlg. Co.'s No. 1 University, 330 ft. from N and 440 ft. from E of S half of Blk. 16 ..... Material on ground; machine.

Gerber O. & G. Co.'s No. 1 Stubbs, 330 ft. from S, 990 ft. from W, Sec. 9, Blk. 3, B.&B. Sur. ..... Cellar.

H. V. Greer's No. 1 Carr, 150 ft. from NW and 510 ft. from SW, Sec. 12, Blk. 5, H.&T.C. Sur. ..... S.D. 2,323 ft.

Gulf Prod. Co.'s No. 14 Hutchings, 330 ft. from N and W of Sec. 9, Blk. O ..... T.D. 2,739 ft.; plugged back 2,695 ft.; swabbed 50 bbls. fluid; 20 bbls. was water.

Gulf Prod. Co.'s No. 16 Hutchings, 1,932 ft. from S and 1,650 ft. from W, Sec. 5, Blk. F ..... Rigging up.

Gulf Prod. Co.'s No. 26 O'Brien, 2,347 ft. N, 330 ft. E. Sec. 16, Blk. F ..... T.D. 2,634 ft.; fishing; oil and gas 2,629-34 ft.

Gulf Prod. Co.'s No. 29 O'Brien, 990 ft. N of SW cor., Sec. 6, Blk. F ..... Location.

Krogle et al's No. 1 Reasler, 3,062 ft. from SE, 330 ft. from NE, Sec. 46, Blk. 34, H.&T.C. Sur. ..... S.D. 2,000 ft.; plugged back to 1,452 ft.; drlg. by tools 1,935 ft.

Magnolia Pet. Co.'s No. 1 Brillhart, 2,310 ft. from NW and SW, Sec. 13, Blk. 34, H.&T.C. Sur. ..... Drlg. 2,245 ft.

Maxwell's No. 1 Smith, 330 ft. from NW and SW, Sec. 16, Blk. 34, H.&T.C. Sur. ..... T.P. 2,456 ft.; T.D. 2,680 ft.; fishing for bit.

George McCamey's No. 1 Carey, 2,310 ft. from NW and 330 ft. from NE, Sec. 5, Blk. 5, H.&T.C. Sur. ..... T.D. 2,522 ft.; 2 bailers salt water hour 2,515-30 ft.; increase water 2,525-40 ft.

Moran et al's No. 1 Reynolds, 170 ft. from SE and SW of NW 80 of NE half Sec. 12, Blk. 5, H.&T.C. Sur. .. S.D. 405 ft.

Penn Oil Co.'s No. 1 Hardage-Wilson, 330 ft. from NE and SE Sec. 11, Blk. 34, H.&T.C. Sur. ..... T.D. 2,520 ft.; cleaning out; shot 60 qts. 2,405-35 ft. and 40 qts. 2,462-75 ft.; 70 bbls. per day before shot.

Prince Bros.' No. 2 Hall-Roberts, 1,470 ft. from NE and 2,300 ft. from NW, Sec. 14, Blk. 34, H.&T.C. Sur. .... S.D. 920 ft.

Rector Oil Co.'s No. 1 Monroe, 660 ft. from NE and SE, Sec. 42, Blk. 33, H.&T.C. Sur. ..... S.D. 4,150 ft.

Rowan & Nichols' No. 1 Street, 990 ft. from SE and 330 ft. from NE, Sec. 17, Blk. 34, H.&T.C. Sur. ..... T.D. 2,269 ft.; running 8¼-in. csg.

Southern Oil Co.'s No. 1 Sloan, 1,650 ft. from NE and 330 ft. from NW, Sec. 24, Blk. 5, H.&T.C. Sur. ..... S.D. 2,082 ft.

Stanolind Oil & Gas Co.'s No. 1 Whitlock, 495 ft. NE, 2,300 ft. SE, Sec. 14, Blk. 34, H.&T.C. Sur. ..... T.D. 2,515 ft.; plugged back 2,475 ft.; to shoot.

Sturm et al's No. 4 Jones, 2,310 ft. from SW and 990 ft. from SE Sec. 25, Blk. B-29, P.S.L. Sur. ..... To test 2,546 ft.

T. P. Coal & Oil Co.'s No. 7 James, 1,320 ft. from SW and SE, Sec. 8, Blk. 34, H.&T.C. Sur. ..... T.D. 2,270 ft.; tested 7,000,000 ft. gas; tools stuck; fishing for tools.

Thompson's No. 1 Johnson, 2,310 ft. from SW and 330 ft. from NW, Sec. 9, Blk. 34, H.&T.C. Sur. ..... T.D. 2,351 ft.; flowing 50 bbls. per day.

WINKLER COUNTY

Colonial Oil Co.'s No. 1 State vacancy, 330 ft. E and 103 ft. N of NW cor. Sec. 3, Blk. 77, P.S.L. Sur. ..... T.D. 1,320 ft.; S.D.

Richardson et al's No. 1-B Scarborough, 990 ft. from S and 1,980 ft. from E, Sec. 18, Blk. 74, P.S.L. Sur. .... T.D. 2,640 ft.; fishing tools; est. 2,000,000 ft. gas at 2,640 ft.

Richardson et al's No. 2 Scarborough, 1,980 ft. from N and 660 ft. from E. Sec. 1, Blk. 77, P.S.L. Sur. ..... S.D. 2,330 ft.; est. 150 bbls. per day.

Wildcat Operations in Texas Panhandle

Week Ending February 20

CARSON COUNTY

Company, well, farm name, section and block—	Remarks:
Gulf Prod. Co.'s No. 6 Cooper, 330 ft. from N and W SW, Sec. 4, Blk. 9, L.&G.N. Sur.	S.D. 3,075 ft.; T.P. 3,035 ft.; to test.
Panhandle Rfg. Co.'s No. 1 Kirby, 1,320 ft. N and W, Sec. 182, Blk. 3, L.&G.N. Sur.	Drlg. plug 2,488 ft.
Texas Interstate P. L. Co.'s No. 1 Burnett, 1,333 ft. N, 2,575 ft. E of N¼ Sec. 97, Blk. 5, L.&G.N. Sur.	T.D. 2,368 ft; running 8¼-in. csg.
Union Pet. Co.'s No. 3 Cooper, 330 ft. N, 310 ft. E SE, Sec. 5, Blk. 9, L.&G.N. Sur.	Cellar.

CHILDRESS COUNTY

Robertson's No. 1 Biddy, center S 26½ acres of N, Laughlin Sur. Blk. T	Drlg.

COLLINGSWORTH COUNTY

Kates et al's No. 1 Hickman, center NE, Sec. 43, Blk. 10, H.&G.N. Sur.	S.D. 2,275 ft.
Kates et al's No. 1 Bell, 200 ft. from N, 2,310 ft. from W, Sec. 21, Blk 102, H.&G.N. Sur.	S.D. 2,703 ft.
Tittle, Cochran et al's No. 1 Boyles, 150 ft. S and E of Sec. 90, Blk. 14, H.&G.N. Sur.	Location.

DEAF SMITH COUNTY

Western Union Oil Co.'s No. 1 Farwell, C NW, Sec. 18-2n-2e	S.D. 1,240 ft.

GRAY COUNTY

Back & Barber's No. 1 Back, 660 ft. from S, 330 ft. from W, Sec. 140, Blk. 25, H.&G.N. Sur.	S.D. 2,423 ft; moving in csg.
Baldridge et al's No. 1 Melton, 330 ft. from NE E half NE, Sec. 95, Blk. B-2, H.&G.N. Sur.	S.D. 3,075 ft.; T.P. 3,013 ft.; 40 bbls.; to make 5-day test.
Baldridge et al's No. 1 Catlin, 330 ft. S and E of E 80 of 158-ac. tract, Sec. 57, Blk. 3, L.&G.N. Sur.	Fishing 3,120 ft; T.P. 3,090 ft.
Baldridge O. Co.'s No. 1-B Melton, 330 ft. from N and E of SW, Sec. 95, Blk. B-2, H.&G.N. Sur.	Fishing 1,815 ft.
Gerdan Burch's No. 1 Laugham, 990 ft. S, 330 ft. E. Sec. 1, W½ NE, Sec. 1, Blk. B-2, H.&G.N. Sur.	T.D. 2,505 ft; rebuilding burned rig; est. 15,000,000 ft. gas.
Cantone Oil Co.'s No. 2 Morse, 330 ft. from N, 330 ft. from E line, Blk. 9-A, Sec. 15, H.&G.N. Sur.	Location.
Christy's No. 1 Gethings, 330 ft. from N and E, Sec. 13, Blk. A-9, H.&G.N. Sur.	S.D. 1,760 ft.
Sam Danner's No. 1 Cobb, 330 ft. S and W NE, Sec. 165, Blk. 3, L.&G.N. Sur.	Drlg. 2,048 ft.
Dolomite Prod. Co.'s No. 1 Sailor, 330 ft. N and E, Sec. 111, Blk. 3, L.&G.N. Sur.	U.R. 8¼-in. csg. at 2,285 ft.
Gerber O. & G. Co.'s No. 1 Stubbs, 330 ft. from S, 990 ft. from W, Sec. 9, Blk. 3, B.&B. Sur.	Rig.
Gray County Prod. Co.'s No. 1 Huselby, 330 ft. from S and W, E½ NW, Sec. 55, Blk. 25, H.&G.N. Sur.	Drlg. 2,650 ft; 3 bbls. oil in 12 hrs.
Mazda-Shell Pet. Corp.'s No. 3 Combs-Worley, 330 ft. from N and W NE, Sec. 35, Blk. 3, L.&G.N. Sur.	S.D. to test; T.D. 3,058 ft.
Mazda-Shell's No. 4 Coombs-Worley, 990 ft. from N line 330 ft. from E line, Sec. 25, Blk. 3, L.&G.N. Sur.	Rig.
Mid-Kansas O. & G. Co.'s No. 1 Gethings, 330 ft. S, 1,650 ft. W S½ S½, Sec. 13, Blk. A-19, H.&G.N. Sur.	T.D. 2,788 ft; pumped 3 bbls. second 24 hrs.; may plug.
Ochiltree et al's No. 1 Hughey, 340 ft. S, 330 ft. E E half SE, Sec. 129, Blk. 3, L.&G.N. Sur.	S.O. 3,168-72 ft; S.D. 3,180 ft; for pipe line connection.
Parton & Holt's No. 2 Morse, 330 ft. from W, 250 ft. from N, W½ SW, Sec. 5, Blk. 26, H.&G.N. Sur.	S.D. 2,635 ft; to shoot.
Parton Holt's No. 3 Morse, 660 ft. from N and E of E half SW. Sec. 5, Blk. 26, H.&G.N. Sur.	S.D. 2,641 ft.
Peterson & Holt's No. 1 Gething, 330 ft. from S and W of N½ SE Sec. 13, Blk. 9-A, H.&G.N. Sur.	Cellar.
Phillips Pet. Co.'s No. 1 Davidson, 330 ft. N and W, Sec. 36, Blk. B-2, H.&G.N. Sur.	T.D. 2,883 ft; running 6-in. csg.
Quicksand Oil Co.'s No. 2 Chapman, 165 ft. N, 775 ft. from E of W 60 ac. of N½ NW, Sec. 69, Blk. 25, H.&G.N. Sur.	T.P. 2,720 ft.
Saunders et al's No. 2 Sullivan, 822 ft. from W, 231 ft. from NE, 160 ft. S, 264 ac. of N¼, Sec. 136, Blk. 3, L.&G.N. Sur.	Will plug back to 3,275 ft. and shoot.
Sinclair Prairie Oil Co.'s No. 1-E Combs-Worley, 330 ft. from S and E, Sec. 34, Blk. 3, L.&G.N. Sur.	Rig.
Skelly Oil Co.'s No. 1 C. Thut, 330 ft. from S line, 330 ft. from W line, SW Sec. 1, H.&G.N. Sur., Blk. 1.	Spudded.
Skelly Oil Co.'s No. 1 Gething, 990 ft. from S and W of Sec. 48, Blk. 9-A, H.&G.N. Sur.	T.D. 2,078 ft; running 8¼-in. csg.
Skelly Oil Co.'s No. 3-A South Jackson, 330 ft. N, 1,650 ft. E, Sec. 88, Blk. B-2, H.&G.N. Sur.	T.D. 2,845 ft; cmtd. csg. 2,790 ft.
Sun Oil Co.'s No. 1-B Combs-Worley, 330 ft. S and E of SW Sec. 34, Blk. 3, L.&G.N. Sur.	Standardizing.
Tedesco-Bell O. & G. Co.'s No. 4 Morse, 990 ft. N and W SE, Sec. 1, Blk. 26, H.&G.N. Sur.	Rig.
The Texas Co.'s No. 1 Gethings, 330 ft. from S line, 330 ft. from W line, S½ Sec. 47, Blk. 9-A, H.&G.N. Sur.	T.D. 2,905 ft.; P.B. to 2,800 ft.; 1,000 ft. oil in hole.
Paul Tharp's No. 1 Short, 330 ft. from N and W of Sec. 3, Blk. 1, H.&G.N. Sur.	T.P. 2,968 ft.; drlg. 3,028 ft.
Sam Travis' No. 1 Back, 330 ft. S and E E half NE, Sec. 44, Blk. 25, H.&G.N. Sur.	Rigging up machine.
Trippiehorn Bros.' No. 1 Lovett, 330 ft. from N and W, Sec. 57, Blk. B-2, H.&G.N. Sur.	T.D. 3,154 ft; pumped 99 bbls. first 24 hrs.; 89 bbls. second 24 hrs.
Warner Oil Co.'s No. 1 Webb, 660 ft. from S and W of W 80 of N½ Sec. 42, Blk. 25	Moving in rig.
Weltzel Oil Co.'s No. 2 Morse, 330 ft. from S and E of N half NW, Sec. 67, Blk. 25, A.&G.N. Sur.	T.D. 2,675 ft.; plugged back to 2,285 ft.; to set csg.

HEMPHILL COUNTY

Hoover's No. 1 Hoover, 350 ft. from N, 1,200 ft. from E, G. S. Hood Sur.	T.D. 5,250 ft.; S.G. 5,245 ft.

HUTCHINSON COUNTY

Alexander's No. 1 Cockrell, 330 ft. N and E of E 80 of S 160, Sec. 3, Blk. M-2, T.C. Sur.	Drlg. 2,575 ft.
Danciger O. & R. Co.'s No. 1 Johnson, 330 ft. N and W, SE, Sec. 34, Blk. Y, A.&B. Sur.	Spudded and S.D.
Deal O. & G. Co.'s No. 2 Sanford, 330 ft. N and E of N 80 ac., S 160 ac., Sec. 81, Blk. 46, H.&T.C. Sur.	S.D. 450 ft.
Huber Pet. Co.'s No. 1 Moyer-Johnson, 990 ft. from N, 330 ft. from E half SW, Sec. 34, Blk. Y, A.&B. Sur.	S.D. 3,004 ft.
Huber Pet. Co.'s No. 1 Works, 1,342 ft. from S and 1,813 ft. from E, Sec. 7, Blk. Y-2, T.T. Sur.	Increase gas 2,260-65 ft; drlg. 2-340 ft.
Liner Drlg. Co.'s No. 1-D Johnson, 330 ft. from N and E, Sec. 6, Blk. 1, B.&B. Sur.	T.D. 3,146 ft.
Joe Murphy's No. 1 Watkins, 440 ft. from N and W of N half, Sec. 13, Blk. M-21	T.P. 2,923-60 ft; S.D. for P.L. connection; T.D. 2,964 ft.
Pharis Oil Co.'s No. 5 Smith, 660 ft. from N and W, SW, Sec. 14, Blk. Y, M.&C. Sur.	Shut down.
Stanolind O. & G. Co.'s No. 4-A Ware, 330 ft. S and W NE, Sec. 124, Blk. 4, L.&G.N. Sur.	T.P. 3,068-3,104 ft; T.D. 3,194 ft.; pumped 172 bbls. first 18 hrs.
H. Steckol's No. 1 J. A. Whittenburg (Amerada), 430 ft. from S line, 990 ft. from W line, Sec. 37, T.C.R. R. Sur.	Drlg. 1,856 ft.
Texlivania Oil Co.'s No. 1 Hallc, 330 ft. S, 280 ft. W, Sec. 16, Blk. 1, E.L.R.R. Sur.	Ran 8¼-in. csg. 2,105 ft.

LIPSCOMB COUNTY

Okla. Public Service Co.'s No. 1 C. W. Jones, NE SW, Sec. 100, H.&T.C. Sur.	T.D. 5,003 ft.

MOORE COUNTY

Canadian River Gas Co.'s No. 2-A Perkins, 3,250 ft. S of most northerly NE cor, 200 ft. W of E line, Sec. 54, Blk. 47, H.&T.C. Sur.	T.D. 1,012 ft; cmtd. 12½-in. csg.
Dogie Oil Co.'s No. 1 Greenwald, 330 ft. from N and W, Sec. 277, Blk. 44, H.&T.C. Sur.	S.D. 2,500 ft.
Shamrock Oil & Gas Co.'s No. 1 Burnett, 660 ft. from S, 330 ft. from W. Sec. 359, Blk. 44, H.&T.C. Sur	T.D. 3,880 ft; 800 ft. wtr. in hole.

MOTLEY COUNTY

Matador Oil Corp.'s No. 1 Owens, C NE, Sec. 10, Blk. G, B.&B. Sur.	S.D. 530 ft.

OLDHAM COUNTY

Chambers et al's No. 1 Herring, CNL, Sec. 20, Blk. S, G.C.&S.F. Sur.	Fishing 4,000 ft.

ROBERTS COUNTY

Chicken Creek Oil Co.'s No. 1 Ledrick, 330 ft. N and W, Sec. 55, Blk. C, G.&M. Sur.	S.D. 4,970 ft.

WHEELER COUNTY

Delaney et al's No. 1 Sitter, 330 ft. from S and W of E half NE, Sec. 33, Blk. 24	Drlg. 2,652 ft; estimated 15,000,000 ft gas.
Devore & Robinson's No. 1 Sitter, 2,310 ft. from S and E, E½, Sec. 33, Blk. 24, H.&G.N. Sur.	T.D. 2,760 ft.; S.D. for pipe line connection.
Helena O. & G. Co. et al's No. 1 Below, C NE SW, Sec. 50	Spudded and S.D.
Osborne et al's No. 3 Sloss & Admire, 330 ft. from N line and 1,650 ft. from E line of NE Sec. 47, H.&T. C. Sur., Blk. 13	Ran 10-in. csg. at 415 ft.
R. M. Rhodes' No. 1 Noel, 330 ft. S and E NE, Sec. 54, Blk. 24, H.&G.N. Sur.	Rig.
Rogers & Harner's No. 1 J. O. Clark, 990 ft. S and W of Sec. 6, Blk. 24, H.&G.N. Sur.	Moving in material.

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Oklahoma Corporation Commission Hampered by Court Decision Calling Its Orders Void

By W. A. SPINNEY
Staff Correspondent, Oklahoma Fields

For a brief period in the past week Oklahoma oil producers were wondering how long proration was going to hold in the Oklahoma City Field, after reports and rumors that wells were being opened and produced in violation of the Corportion Commission's allowables, following the decision of the State Supreme Court in the Wilcox Oil & Gas Co.'s case, declaring the commission's orders void.

Some 41 producers in the Oklahoma City Field were reported to have opened their wells but the wells were later shut in by the sheriff's force after temporary restraining orders were issued in the district court by Judge Tom G. Chambers. The restraining orders were directed against wells that were producing in excess of their February allowables.

The State's daily average production for the week ending February 18 was 428,200 bbls., an increase of approximately 54,000 bbls. daily. This increase was due to the purchasing companies nominating 27,000 bbls. additional daily from the Oklahoma City Field on February 15, retroactive to February 1.

Supreme Court's Decision

The State Supreme Court handed down its final decision in the H. F. Wilcox Oil & Gas Co.'s case, vacating the orders of the Oklahoma Corporation Commission. The decision upholds the validity of proration and the legality of the ratable taking law, but the practice of making special allowables on the flow of crude oil from certain wells was declared void. The commission was told to make new oil rules.

The opinion held that the commission administered proration without any set rules and regulations or fixed procedure and therefore its orders were illegal.

The court held that proration other than on a per well basis is void; that the commission has no authority to make special or local rules, and that all orders must be general and apply to all prorated areas.

The Corporation Commission's orders issued last July, shutting down 10 of the Wilcox Oil & Gas Co.'s wells in the Oklahoma City Field for alleged overproduction of approximately 1,000,000 bbls. of oil, was declared void.

The court upheld the contention of the Wilcox Oil & Gas Co.'s attorneys, that the commission attempted to shut down all of the company's wells without first having adopted a set of rules and regulations determining its procedure, that it attempted to prorate four sources of supply as one source of supply.

The rewritten decision was filed with the clerk of the Supreme Court last Tuesday, about the same time the Wilcox Oil & Gas Co. filed a petition for a rehearing in another case, in which a decision was handed down by the State Supreme Court about two weeks ago. In that case, the court had ruled the State had the right to seek and obtain injunctive relief from the district courts, when proration orders were violated. The Wilcox Oil & Gas Co.'s attorneys asked for a rehearing on the grounds that the district courts do not have jurisdiction to enforce the proration law or any rules and regulations linked with the proration law and that jurisdiction is vested with the Corporation Commission.

The opinion reads that the Corporation Commission has no authority to make an order shutting down an oil well because the operator of that well has transported or sold oil in an amount larger than the amount to be produced from the well under the allowable fixed by the Corporation Commission. If the well is to be shut in it must be after proof that the production from the well was in excess of the proportionate amount of oil produced from the common source of supply.

In holding the proration orders void the opinion said that under the statutes of Oklahoma, proration must be on a per well basis among the wells producing from a common source of supply without regard to the identity of the producer or to the number of wells being produced by him.

In the Oklahoma City Field the orders provide for a per well basis of proration except in the Siliceous lime area. In the Greater Seminole area and in the other prorated fields in the State, proration is on a lease basis. The Corporation Commission has permitted Oklahoma City operators to transfer allowables from one well to another well on the same lease.

The opinion said that the Oklahoma City Field has been classed as having four sources of supply and the Commission's order setting this forth is incorporated. In the original opinion, it held that the commission could fix allowables on each source of supply. Starting December 1, 1932, the commission followed this procedure, and it is still in force.

Protest from Holdenville

A delegation from Holdenville will appear before the Corporation Commission February 24 to protest against making permanent the commission's order setting the oil-gas ratio to 5,000 feet per barrel in the West Holdenville Pool in Hughes County. A temporary order was made after potential tests were made in that field showing that the open gas volume on a four-hour basis totaled 424,591,000 feet of gas daily. The potential tests showed that the field had a potential of 19,497 bbls. of oil per day, estimated on the results of four-hour tests. The daily allowable production according to the nominations was 2,251 bbls. daily, but after the potential tests the allowable was reduced to 943 bbls. daily under an order of the commission, because only five wells in the field were under the 5,000-feet oil-gas ratio and one was granted special permission to produce because of finding an outlet for its gas. Unless the allowable is increased the new refinery which is being planned for Holdenville will be moved to another site.

WEST HOLDENVILLE OPEN FLOW TESTS

Company and lease—	Oil potential (bbls.)	Gas volume (cu. ft.)	Gas-oil ratio	Daily oil allowable
Armstrong et al, Narcomey*	1,098	13,710,000	12,486	138
Burke-Greis, Chapman	387	961,000	2,483	49
Bootcher-Blackwell, Jacobs	1,785	1,880,000	1,053	224
Felmlee, Chupco	734	1,756,000	2,392	92
Mid-Continent, Bruner*	299	8,458,000	28,287	38
Mid-Continent, Harjo*	2,393	18,426,000	7,700	301
Mid-Continent, Jacobs*	305	27,369,000	89,734	38
Mid-Continent, Tiger*	1,680	13,348,000	7,945	211
Manahan, Long*	949	23,184,000	24,429	119
Manahan, Chapman*	485	28,978,000	59,367	61
Manahan, Tiger*	1,135	18,824,000	16,585	143
Manahan, Narcomey*	536	9,600,000	17,910	67
Murrah & Bonahan, Jacobs*	519	65,690,000	126,570	65
Pringle & Marshall, Church	3,257	15,081,000	4,630	409
Pringle & Marshall, Atkins*	968	7,728,000	7,983	122
Phillips Pet., Jacobs*	429	30,940,000	72,121	54
Robinson & Hicks, Jacobs*	612	26,227,000	43,998	77
Sovereign, Scott	1,008	2,358,000	2,339	127
Watkins, Jacobs*	587	90,663,000	154,451	74
Winona, Narcomey	331	8,710,000	26,314	42
Total	19,497	424,591,000		2,451

*These wells have a gas-oil ratio in excess of 5,000 feet per barrel and have been ordered shut in by the Corporation Commission.

Potential Tests Postponed

The taking of new potentials in the Oklahoma City Field was indefinitely postponed to await a new proration law. The Oklahoma Corporation Commission decided that no potentials will be taken after Governor Murray sent a request to the commission for the delay. Potential tests were scheduled to start February 15 in the Oklahoma City Field. This would have been the first general potential test of all the wells since November, 1931. Only new wells have been given potential tests since that date.

The governor said he did not think it was proper that potential tests be taken at this time, and that he would not permit the use of the militia in this work.

The Corporation Commission in ordering the tests had provided that the work be under the supervision of the chief conservation agent. It was also planned to use about 20 members of the militia who have had oil field experience to supervise the work under the direction of the conservation agent. The present statute provides that deputy conservation agents be approved by the governor and the list was ready to send to him when his message came to the commission.

About two weeks ago a general hearing of operators was held in Oklahoma City and another meeting about a week later before the Corporation Commission, to determine means and methods of taking the tests, but no agreement was reached at that time. Considerable opposition was expressed by operators to taking potentials of wells in the Simpson sand zone of the Oklahoma City Field because of water intrusion.

Hearing on the petition for the shutting down of the wells in the Oklahoma City Field for 30 days or longer if necessary and until such a time as the state legislature can pass a new conservation law has been set for February 24 before the Corporation Commission. The petition was filed by the Anderson-Prichard Oil Corp. and the trustees for the T. B. Slick estate.

The shutdown would apply to all wells in the field other than those that are making water and those which would be materially injured by being shut in.

In Greater Seminole

In the Greater Seminole area, Southern Oil Corp.'s No. 1 in the SE cor. NE Section 4-8-5, is a location in the Carr City Field in Pottawatomie County. Gypsy Oil Co.'s No. 1 Tinwas, SE cor. NW Section 25-6-4, in the West Konawa Field of Pottawatomie County, was landing 8-inch casing at 3,255 feet in the Viola lime. The well found the top of the Hunton lime at 3,132 feet, the Sylvan shale at 3,157 feet and the top of the Viola lime at 3,240 feet.

An interesting wildcat test is drilling east of production in the St. Louis Pool. It is the Wood Oil Co. and others' No. 1 Ashby, SW cor. NE NW Section 22-7-5, located about a mile east of the eastern edge of the St. Louis Pool and was drilling at 2,500 feet on the last reports.

Amerada Petroleum Corp.'s No. 1 Har-

Wildcat Operations in Oklahoma

Northern Oklahoma

ATOKA COUNTY

Company, farm and location— Remarks

Independent Drlg. Co.'s No. 2 D. James (twin), C NE NE Sec. 28-3-15 ..... Comp. 5 bbls. 371-426 ft.
Barton's No. 4 Miller, SE NW SE Sec. 24-1-14 ..... Abd. 505 ft.
George's No. 1 Reddin, SW NE SW Sec. 19-1-15 ..... S.D. 640 ft.

BECKHAM COUNTY

Pattel Royalty's No. 1 Goose Tree, SW SE SW SE Sec. 32-10-22w ..... Drlg. 2,000 ft.
Mid-Texas Co.'s No. 1 Sidell, NE cor. SW SW Sec. 17-12-22w ..... S.D. 2,550 ft.
White et al's No. 1 Green, SW cor. Sec. 34-10-24w ..... S.D. 2,575 ft.

BLAINE COUNTY

Watonga Petroleum Co.'s No. 1 Masters, SW NW NW, Sec. 27-16-11w ..... S.D. 1,205 ft.

CADDO COUNTY

Denver P. & R. Co.'s No. 1 Noe, NW SW SW Sec. 34-10-10w ..... Drlg. 5,000 ft.
Abernathy & Brown's No. 2 Houston, Sec. 24-6-13w ..... S.D. 1,115 ft.

COAL COUNTY

Dodd & Burton's No. 1 Grigsby, NW SE NE Sec. 26-1-8 .. S.D. 1,100 ft.
Funk & Russell's No. 1 Miller, SE NE Sec. 19-2-8 ..... S.D. 2,750 ft.

COMANCHE COUNTY

G. W. Stogner's No. 1 Doebel, C SW SW Sec. 3-3-9w ..... S.D. 1,450 ft.

CREEK COUNTY

Sinclair Prairie Oil Co.'s No. 1 Tiba, SW SE NW Sec. 29-14-7 ..... Rig.
O. O. Owen's No. 1 fee, NW cor. Sec. 33-15-7 ..... T.D. 3,145 ft.

CUSTER COUNTY

Miley Pet. Co.'s No. 1 Caldwell, NE Sec. 13-14-14w ..... Location.

ELLIS COUNTY

Algers Pet. Co.'s No. 1 Roper, C SE NW Sec. 21-20-24w ... S.D. 50 ft.

GRADY COUNTY

English Drlg. Co.'s No. 1 Heenan-Coe, NE SE NE Sec. 33-3-7w ..... S.O. 3,355-87 ft; S.D. 3,504 ft.

GARFIELD COUNTY

Continental Oil Co.'s No. 1 Thompson, NW SW SW Sec. 7-24-4w ..... Rig.
E. L. Love et al's No. 1 White, SE cor. NW Sec. 9-24-4w .. S.D. 5,850 ft.

GREER COUNTY

French's No. 1 Murphy, SW NW Sec. 33-7-21w ..... S.D. 1,645 ft.

(Continued on Next Page)

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rison, NW cor. SW Section 33-7-4, is a new location in the South St. Louis area in Pottawatomie County.

Sunray Wants More Oil

Sunray Oil Corp. applied to the Corporation Commission through its receiver, C. H. Wright, to increase its nominations from the Oklahoma City Field to 15,000 bbls. a day, effective at once. All of the oil comes from the Wilcox sand zone.

The company also petitioned the commission for 285,561 bbls. of oil from three of its leases, alleging the properties are entitled to this amount since the special and water allowable exemptions have been held illegal by the State Supreme Court. The commission has set February 24 to hear the case, at which time the commission has several other cases scheduled.

The Sunray Oil Corp. states in the petition that it wants to take 185,016 bbls. of oil from its Twyford-Smith lease, 58,285 bbls. from its Reinhart-Donovan lease and 42,260 bbls. from its Meade lease. These leases have a combined potential of 54,366 bbls. of oil a day. The Meade lease has a potential of 19,673 bbls., the Reinhart-Donovan lease 20,978 bbls. and the Twyford-Smith has a potential of 13,714 bbls. a day.

Sunray Oil Corp.'s new nomination is the third received by the commission since the last proration order was made February 1. The first was made by the Stanolind Crude Oil Purchasing Co. which asked for 12,000 bbls. a day and the Phillips Petroleum Co. for 15,000 bbls. a day, both to be effective as of February 1.

This nomination brings the total outlet for the Wilcox sand wells in the Oklahoma City Field to 102,220 bbls. a day, and the total outlet for the field to 135,465 bbls. The allowable for the State would be 448,229 bbls. daily.

The petition points out that many operators in the Oklahoma City Field are operating wells in both the Simpson and Wilcox sand horizons, in such a manner as to waste the gas and the gas energy found in these zones. The purpose of this gas and the most valuable use for it is the lifting of oil from the various sands and when the gas and gas energy is exhausted in the Oklahoma City Field millions of dollars will be spent to produce the oil which otherwise would be produced by the natural energy. Under the new proration law this wastage of gas will be prevented and a delay is asked.

The petition points out that under the decisions of the various courts, there is no way at this time by which the proration laws found on the statute books can be enforced.

Many express the opinion that proration in the flush fields of the State will continue in force until the new proration bill is passed. Reports were circulated during the week after the Wilcox Oil & Gas Co.'s decision was made by the State Supreme Court, that the Oklahoma City Field would be thrown wide open but only a few wells were open last week and these were shut in soon afterwards.

Atoka County

Independent Drilling Co.'s No. 4 James, C N half NE Section 28-2-15, was spudding. Vanderpool and Williams' No. 1 Downing, SW cor. NW SE Section 8-1-14, was abandoned at 302 feet.

Carter County

Magnolia Petroleum Co.'s No. 8 Tubbi, SE cor. NW NE SE Section 24-4-3w, made 5 bbls. from 1,803-30 feet. Same company's No. 2 Hooks, CSL NW SW SW Section 13-1s-3w, was dry and abandoned at 2,681 feet. Carter Oil Co.'s No. 2 Spragins, NE cor. NW NW SW Section 19-1s-2w, made 355 bbls. from 1,691-1,928 feet.

Creek County

Shamblin and others' No. 1, SE cor. SW SE Section 8-14-8, is a rig. Robinson and others' No. 2 Prince, SW cor. NE Section 3-18-8, is a location. A. Whitten and others' No. 1 Norman, CNL NW SE Section 8-18-12, made 2,500,000 feet of gas from 1,501-13 feet. Sherry and Murta and others' No. 2 Cruel, C N half NW SE Section 36-17-11, made 12 bbls. from 2,661-66 feet.

Hughes County

Redwine and others' No. 1 Badger, SW cor. NW Section 4-5-11, is a location. Nash-Redwine and others' No. 1 Uri, C NE Section 10-5-11, was abandoned at 1,600 feet.

Jefferson County

Farlyn Oil Co.'s No. 5 Seay, NE cor. SW SE Section 3-7-5w, is a rig. J. Peacock's No. 1 Hornbeck, NW cor. NE NW NE Section 10-7s-6w, made 3,000,000 feet of gas from 817-57 feet. O. V. Beck's No. 4 Seay, NW cor. NE SW SE Section 34-6s-5w, made 116 bbls. from 1,539-1,617 feet.

Marshall County

Abbott and others' No. 1 Simmons, NW cor. Section 13-6-6, is a machine.

Noble County

Shell Petroleum Corp. and others' No. 1 Whitton, C SE SE Section 7-20-2w, is a location. Same companies' No. 1 Farr, C NE NE Section 19-20-2w, is a location. Midco Oil Co.'s No. 16 Washburn, SW cor. NE SW Section 15-23-2w, an old well drilling deeper, was rigging, total depth 2,677 feet. Magnolia Petroleum Co.'s No. 1 Young, NE cor. NW NW Section 22-21-2w, an old well drilling deeper, drilled from 5,119 feet to 5,212 feet, making 286 bbls.

Osage County

Lewis Production Co.'s No. 2, SW cor. SE SE Section 28-24-7, is a rig. Same company's No. 2, SW cor. NE SE Section 28-24-7, made 70 bbls. after a 120-quart shot from 2,565-2,641 feet.

Okmulgee County

Sheldon Oil Co.'s No. 1 Grayson, SE cor. NW SE Section 15-13-12, is a rig. Iron Mountain Oil Co.'s No. 4 Fife, NW cor. NE NE Section 4-15-11, made 10 bbls. from 2,001-53 feet. Buckingham and Peal's No. 1 Robinson, CNL NW SE Section 18-13-13, was abandoned at 2,475 feet.

Oklahoma County

Hodges and others' No. 1 Burroughs, SE cor. SW NW Section 10-11-3w, is a rig.

Pawnee County

Geraldine Oil Co.'s No. 9 Riverbed, NW cor. SW Section 30-21-9, made 1 bbls. from 1,081-1,110 feet.

Pottawatomie County

Reynolds Drilling Co.'s No. 1 Swan, SE cor. SW SE Section 36-7-4, is a location. Magnolia Petroleum Co.'s No. 1 Brister, SW cor. NE Section 28-7-4, made 448 bbls. from 4,181-99 feet.

Pontotoc County

Hughes and others' No. 1 Norris, CNL NE SE Section 28-4-7, is a machine. Texhoma Oil Co.'s No. 1 Butler, SE cor. SW NW Section 21-5-8, is a location. Benedum & Trees' No. 4 Malloy, NW cor. SW SW Section 30-5-5, made 300 bbls. from 2,595-2,603 feet. W. C. Hughes' No. 1 fee, SE cor. SW SE NE Section 28-4-7, was abandoned at 500 feet.

Stephens County

California Producing & Oil Co.'s No. 1 Florence, SE cor. SW SE SW Section 12-3s-6w, is a location. Same company's No. 2 (twin), CWL NE SE SW Section 12-3s-6w, was spudding. Westheimer and Daube's No. 12 Maloney (twin), NE cor. NW NE Section 4-2s-8w, was spudding. Willie and others' No. 1 Cates, SE cor. NW SW Section 15-1s-8w, was abandoned at 2,200 feet.

Tulsa County

Holmes' No. 1 Graves, NE cor. NE SE Section 30-19-10, an old well drilling deeper, was rigging. Same operator's No. 1 Howard, CWL NE Section 19-19-11, is a rig.

Wildcat Operations in Oklahoma

(Continued from Preceding Page)

HASKELL COUNTY

Ault et al's No. 1 Hall, NW SW SW Sec. 14-9-19 ..... S.D. 2,000 ft.
Ault et al's No. 1 Hall, SE NW Sec. 25-9-9 ..... S.D. 200 ft.

HUGHES COUNTY

Redwine et al's No. 1 Ellis, C NW NW Sec. 9-5-11..... Rig.
Nash-Redwine's No. 1 Uri, C NE Sec. 10-5-11 ..... Drlg. 1,600 ft.

KAY COUNTY

Lewis et al's No. 1 Harris, SE NW Sec. 14-25-1 ..... Location.
Mummert Drlg. Co. et al's No. 1 Cormick, C NW SE Sec. 9-27-2 ..... S.D. 3,693 ft.

KIOWA COUNTY

Emenhiser et al's No. 1 Pace, SW cor. Sec. 3-4-17w..... Location.
McWhirter et al's No. 1 Vanderneck, NE NW Sec. 3-7-19w (O.W.D.D.) ..... T.D. 1,902 ft.; C.O.
McWhirter Bros.' No. 1 Kline, SE NW Sec. 5-6-16w..... S.D. 830 ft.
Christian's No. 1 Jones, NE SE Sec. 8-7-18w..... S.D. 1,610 ft.

NOBLE COUNTY

Sinclair Prairie's No. 1 Jerome, SW cor. Sec. 15-20-2w... Location.
Stanolind O. & G. Co. et al's No. 1 Kalb, C NE NW, Sec. 33-20-2w ..... T.D. 5,118 ft; flowed 650 bbls.; shot with 10 qts.; to run tubing and complete.
Rollins et al's No. 1 Frank, SE SW Sec. 6-20-2w..... Rig.

OKLAHOMA COUNTY

Citizens Oil Co.'s No. 1 Sage Barber, NE cor. Sec. 21-11-3w ..... S.D. 1,200 ft.
L. C. Hivick's No. 1 Sunset Addition, NW SW NW Sec. 17-11-3w ..... S.D. 5,515 ft.

PAWNEE COUNTY

G. N. Mainess and Westfield Drlg. Co.'s No. 1 Schildberg, NW SW NW Sec. 27-22-6 ..... S.D. 1,100 ft.
Deep Rock's No. 1 Crow, NE SE Sec. 26-23-5 ..... Drlg. 2,535 ft.
Rockstool's No. 1 Wylie, NW NE SW Sec. 6-20-5 ..... S.D. 1,950 ft.

PITTSBURG COUNTY

Moffett & Hall's No. 1 Jones, NW cor. Sec. 14-8-14 ..... S.D. 1,675 ft.

PONTOTOC COUNTY

Hughes et al's No. 1 Norris, CNL NE SE Sec. 28-4-7.... Machine.
H. L. Warrick's No. 1 fee, SE SW Sec. 29-2-7 ..... Location.
Gilbert's No. 1 Starritt, NW SE Sec. 28-4-6 ..... Rig.
Choctaw O. & G. Co.'s No. 1 Thompson, SW NE SW Sec. 1-1-7 ..... Machine.
Delaney's No. 1 Harden, NE SW Sec. 30-2-7 ..... 13,000,000 ft. gas 1,171-76 ft.; S.D.
Blackwell Oil & Gas Co.'s No. 1 Abbott, NW SW NE Sec. 14-4-6 ..... Sand 1,542-90 ft.; to test.
Williams' No. 1 Krath, NE SE Sec. 33-3-4 ..... S.D. 1,545 ft.
Edna Marie's No. 1 McWhirt, NE SE Sec. 11-2-4 ..... S.D. 515 ft.

POTTAWATOMIE COUNTY

Payne Drlg. Co.'s No. 1 Lovelace, NW SW NW Sec. 27-6-4. Rig.

ROGER MILLS COUNTY

Ute Oil Co.'s No. 1 Williams, C SW Sec. 23-13-24w ..... S.D. 5,150 ft.
L. C. Hivick's No. 1 Davis, C NW NE Sec. 4-11-26w..... S.D. 3,420 ft.

SEMINOLE COUNTY

English et al's No. 1 Harjo, NE SW Sec. 5-5-8 ..... S.D. 676 ft.
Carter Oil Co.'s No. 1 Keokuk, C N half NW NE Sec. 2-10-6 ..... Drlg. 3,611 ft.
Donnelly et al's No. 1 Shepard, SE NE Sec. 4-8-8 ..... Sand 1,395-1,405 ft.; water; fishing 1,640 ft.

WASHITA COUNTY

Miley Pet. Co.'s No. 1 Montgomery, SW NW SE NW Sec. 32-9-17w ..... S.D. 1,475 ft.
Miley Pet. Co.'s No. 1 Wolfe, NE SW Sec. 32-9-17w ..... Rig.
Cooper & Terhune's No. 1 Blocker, NW cor. Sec. 29-8-19w ..... Show oil 3,459-67 ft.; S.D. 3,757 ft
Burns & Prince's No. 1 Deck, SW cor. Sec. 21-8-18 ..... S.D. 2,160 ft.

Southern Oklahoma

ATOKA COUNTY

L. E. Stewart et al's No. 1 Stewart, SE SE Sec. 2-4s-10.. Drlg. 1,195 ft.
Brookshire's No. 1 R. W. Rowland, NW NE SE Sec. 18-3s-10 ..... S.D. 3,435 ft.

CARTER COUNTY

E. M. Boring's No. 1 Morgan, C NE NW SW Sec. 4-1s-3w. Rig.

JEFFERSON COUNTY

Abbott et al's No. 1 Simmons, NW cor. Sec. 13-6s-6..... Machine.
J. D. Wakefield et al's No. 1 Kelly, NW SE Sec. 1-5s-8w.. Spudded and S.D.

MARSHALL COUNTY

Lee Cross' No. 1 Hamlin, SE SW SW Sec. 26-6S-5 ..... S.D. 900 ft.
Thomas' No. 1 Setliff, SW SE SE SW Sec. 36-5s-6..... Drlg. 850 ft.

McCURTAIN COUNTY

Stample's No. 1 Robert Harris, SW NW SW Sec. 14-9s-25.. S.D. 2,775 ft.

PUSHMATAHA COUNTY

Whitehead et al's No. 1 Messer, SE SW SW Sec. 25-3s-13 ..... S.D. 2,096 ft.

STEPHENS COUNTY

Bridwell Oil Co. et al's No. 1 Weldon, NE SW SW NE Sec. 12-3s-5w ..... Drlg. 1,650 ft.
Calif. Prod. & Oper. Co.'s No. 1 Suton, NE SE SW Sec. 13-3s-6w ..... Sand 646-48 ft; S.O.; S.D.
Gillette Bros.' No. 1 Cooley, NW SE NW Sec. 17-3s-5w... Drlg. 2,400 ft.
George's No. 1 Ryan, NW SW NE Sec. 31-3s-15 ..... S.D. 510 ft.

TILLMAN COUNTY

Emenheser et al's No. 1 Pace, C SW Sec. 3-4S-17w..... Spudding.
Gypsy Oil Co.'s No. 1 Pitcher, NW Sec. 26-4s-15w..... Drlg. 1,300 ft.

Tax Commission Officials in Tulsa to Aid Oil Men

T. J. Cleveland and M. F. Barno, representing the Oklahoma Tax Commission, are in Tulsa, with offices in the Mincks Hotel, to assist oil men who are delinquent in payments of state income taxes to straighten out these matters with the commission. It is said about 5,000 residents of Tulsa failed to make returns on income taxes under the state income tax law of 1915 and the tax commission is endeavoring to get these accounts in order.

In stating the object of the visit to the Oil Capital, Mr. Cleveland said: "We are ready to answer inquiries, give information, or assist income taxpayers in any way we can. While here we hope to clean up the state records of those who made no returns under the old income tax law in effect from 1915 to 1930, inclusive."

An 80,000-Barrel Gusher Reported Near Caspian Sea

According to a Moscow dispatch to the New York Times, a gusher is now spouting in the new field of Neptedaga, near Ashkabad, on the Soviet-Persian frontier southeast of the Caspian Sea, at a rate of 80,000 bbls. a day. It was brought in two weeks ago, when it hurled a torrent of 60,000 bbls. daily average 75 yards high. Efforts to cap it were ineffective as the flow increased, overwhelming the local storage facilities and causing grave danger of fire. Tank cars, technicians and special equipment are being rushed from adjoining fields.

T. S. BAILEY DIES

Thomas S. Bailey, aged 88, father of F. W. Bailey, former Tulsa oil man, died last week in Sandy Lake, Pa. He had been in the oil business 60 years, having opened a pool near Lima, Ohio, with the late James S. Patterson. He also engaged in the business in Pennsylvania, where he was associated with the Sinclair and Morrison corporation, and with James A. Britt.

P. J. BAYER DIES

ERIE, Pa., Feb. 20.—Funeral services for Philip J. Bayer, aged 81, president of the Bayerson Oil Works, who died in his home here from heart attack, were held this morning. Pallbearers were associates in the Quaker State Oil Refining Corp.

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Increased Nominations Bring Kansas Production to the Highest Point in More Than a Year

By W. A. SPINNEY
Staff Correspondent, Kansas Fields

The feature of the week's development in Kansas was the finding of a large volume of gas in the chat formation in a wildcat well in northwestern Harvey County. This development points toward the linking of the Hollow and Mabee Pools, which are the only fields in the State producing from the Hunton lime.

The recent increase in the State's nominations by a number of purchasing companies resulted in another increase in the daily average production for the week ending February 18, amounting to approximately 3,000 bbls. daily, bringing the State's average to 102,500 bbls. for the same week. This brought the production of Kansas to the highest point it has reached in more than a year. Production in January, 1932, averaged 102,207 bbls. per day but in no month thereafter did production average 100,000 bbls. per day.

Interesting Test in Harvey

An interesting wildcat well in Harvey County was showing considerable gas while drilling. The well is the Carter Oil Co.'s No. 1 Schmidt, SW cor. SE SW Section 17-22-3w, about a mile northeast of production in the Hollow Pool. The gas was found in the chat formation at 3,149-80 feet, and was estimated at 8,000,000 feet a day. No other well in northwestern Harvey County has found such a large quantity of gas in the chat.

Schleimeyer and others' No. 1 Smith, SE cor. Section 24-8-25w, Graham County wildcat, found a showing of oil and gas in the Oswego lime at 3,762 feet. It was drilling deeper around 3,950 feet.

Another test for oil is being drilled in Trego County. It is the Central Commercial Oil Co.'s No. 2 King, in Section 20-13-21w. The well was drilling on the last reports at 1,675 feet. It is located in the eastern part of the county and is near the discovery well completed by the same company about three years ago.

The Kansas Public Service Commission held a hearing on February 15 on the petition of The Texas Company claiming nonobservance of the 330-foot location in the Voshell Pool, in McPherson County, against the All States Petroleum Corp. No decision was made after the hearing and it was taken under advisement.

The All States Petroleum Corp. claimed that it had pioneered the development in this field and had drilled five wells within a year to locate the Wilcox sand and that the short location now was necessary to get on top of the structure.

Pipe Line Charges

The Kansas Public Service Commission is preparing to issue an order for an investigation of the reasonableness of oil pipe line intrastate carrying rates. C. W. Steiger, commission attorney, is preparing the order, which is expected to be issued in a few days. More than 20 purchasing companies would be named in the order. Hearing is expected to begin on March 21.

The purpose of the investigation is expected to involve the 3 per cent deduction made for basic sediment and strapping charges. Recently an agreement was made in Texas, where, effective May 1, reductions would be made in carrying rates, and a reduction was made in the amount of basic sediment deduction. The Kansas Public Service commissioners said they are interested in seeing that the producers in Kansas continue to retain a market for their crude oil and they should therefore be permitted to remain on a parity with Texas producers.

Hollow Pool Partly Defined

The producing area of the Hollow Pool, in Harvey County, was defined to the southeast during the week by a dry hole. The well, Phillips Petroleum Co.'s No. 2 Warkentine, SW cor. NE SW Section 20-22-3w, was drilled through the Hunton lime to the deep horizons without finding any oil production. The well is being abandoned at a total depth of 3,675 feet. Water was found in the well in Wilcox sand at 3,663-65 feet.

Wildcat Test in Sedgwick

The Carter Oil Co.'s No. 1 Smith, NE cor. Section 30-25-2, is a wildcat location in Sedgwick County. Material is expected to be moved to the location within a few days. To the southwest of this location is H. H. Patton and others' No. 1 Swanson, and to the southeast is the Smith & Ash well, which made considerable oil. The Carter Oil Co. has a small block around the location.

The Derby Oil Co.'s No. 3 Hamm, in Section 33-21-3w, in the Mabee Pool, in McPherson County, has completed a potential test with a rating of 1,622 bbls. after a 12-hour pumping test.

Increased Allowables

The state oil umpire advises that the allowable of the Ritz-Canton-Decker Pool in McPherson County was increased February 7, due to increased nominations in the deep sand area. The allowable was raised from 21 per cent to 24 per cent. There was no change in the nominations for the chat wells, which are to continue to produce 35 per cent of their potential. The total potential of the area on February 1 was 89,022 bbls. The 105 deep sand wells had a potential of 74,119 bbls. and the 71 chat wells a potential of 14,903 bbls. a day.

The umpire advises that several of the areas in the central western part of the State found outlets for crude oil during the months of January and February. The Richardson area in Stafford County secured an outlet of 200 bbls. daily in February and the Chase Townsite area in Rice County an outlet during January.

In January all the purchasers withdrew from the Stoltenberg area. The market outlet in the Stratman area in Ellsworth County was reduced from 17 per cent to 8 per cent of the potential production February 7.

The total potential of the Siliceous lime areas in the central western part of the State on February 1 was 43,696 bbls. from 52 wells. The only areas in this part of the State that do not have market outlets are the Steckel area in Section 31-19-10w, and the Orth area in Section 27-18-10w, both in Rice County; the Scheufler area in Section 9-20-11w, and the Davidson area in Section 4-16-11w, both in Barton County.

The estimated potential of the Voshell Pool, on February 1, was 21,648 bbls. a day from 115 wells. The 16 chat wells in that field have a potential of 2,847 bbls. a day and the 99 deep sand wells a potential of 18,801 bbls. daily.

On February 1 there were eight wells in the Mabee Pool in McPherson County with a potential of 13,502 bbls. a day. The market outlet for crude oil from this area is only 5 per cent of the potential.

The Stanolind Crude Oil Purchasing Co. has increased its nominations from 5 to 15 per cent in the Schurr and Isern Pools, in Rice and Barton Counties. From the Isern area the company is now taking 203 bbls. daily and from the Schurr Pool the company is purchasing 1,797 bbls. a day compared to 600 bbls. it was formerly taking.

In the Hollow Pool, in Harvey County, the Stanolind Crude Oil Purchasing Co. announced it would nominate 200 bbls. a day per well, effective February 13. It is understood that the company will make connections to nine wells in the field, giving the Hollow Pool an additional outlet of 1,800 bbls. daily. The total nominations from this area will now be approximately 9,000 bbls. daily. The oil taken by the Stanolind Crude Oil Purchasing Co. will be transported through the Skelly Oil Co.'s pipe line to Eldorado where it will be switched to the company's own system.

Globe Will be Buyer

The Globe Oil & Refining Co. announced it would purchase oil from the Johnson Pool in McPherson County and it is now building a booster station at the south end of the field, from which it will pump crude oil into the company's trunk line that passes through the field to the refinery at McPherson.

There are now 17 producing wells in the Johnson Pool, which have a combined potential of 14,000 bbls. a day, from the chat formation and the potential flow of the gas from these same 17 wells is estimated at 150,000,000 feet a day.

Each well in the Johnson Field is now limited to 29 bbls. a day because there is now only one market outlet in the field. The Shell Petroleum Corp. has nominated to take 500 bbls. a day from this field and this nomination has remained unchanged for nearly a year.

It is not known yet what the nominations of the Globe Oil & Refining Co. will be. The pumping equipment the company is installing in the Johnson Field will handle around 6,000 bbls. daily. But it is doubtful if the company will take that amount of crude oil.

The Globe Oil & Refining Co. will also extend its pipe line to the Hollow Pool in Harvey County. Other pipe lines serving the Hollow Pool include the Derby Oil Co., Stanolind Crude Oil Purchasing Co. White Eagle Oil Corp. is building a new line to the pool.

Barton County

Mabee Drilling Co. and others' No. 1 Grant, C SW SW Section 4-20-11w, is a rig.

Ellsworth County

J. A. Alyward and others' No. 6 Stratman, SW cor. SE Section 1-17-10w, is a location. Continental Oil Co.'s No. 1 Phelan, NE cor. NW Section 12-17-10w, is a location. Olson Oil Co. and others' No. 1 Brack, C SW SW Section 17-14-10w, was abandoned at 3,338 feet.

Greenwood County

Rex and Phillips Petroleum Co.'s No. 1 Boles, SE cor. SW SW Section 10-22-12, is a location.

Harvey County

Phillips Petroleum Co.'s No. 1 Warkentine, NW cor. SW SW Section 20-22-3w, was abandoned at 3,665 feet. Turner and others' No. 2 Redine, NW cor. SE Section 30-22-3w, was abandoned at 3,747 feet.

McPherson County

Mylius and others' No. 2 Gegier, NE cor. SE SW Section 16-21-3w, is a location. Mid-Kansas Oil & Gas Co.'s No. 1 Schmidt, NE cor. SE NW Section 33-21-3w, made 1,197 bbls. from 3,469-77 feet.

Reno County

Olson Oil Co. and others' No. 1 Voigt, C SE NE Section 26-23-4w, made 12 bbls. of oil from 3,258-3,376 feet. Sinclair Prairie Oil Co.'s No. 1 Base, C SW SE Section 26-23-4w, is a location.

Rice County

Hipple and others' No. 2 Rainet, SW cor. NE SE Section 3-21-6w, made 720 bbls. of oil from 3,377-81 feet. Rogers and others' No. 4 Rainet, SE cor. NW SE Section 3-21-6w, is a location.

Rooks County

Kruger and others' No. 1 Rathburn, SE cor. NW SW Section 14-9-16w, is a location.

Sedgwick County

Carter Oil Co.'s No. 1 Rowley, CEL NE NE Section 30-25-2, is a location.

Wildcat Operations in Kansas

(Descriptions are East unless marked otherwise)

BARTON COUNTY

Company, farm and location—	Remarks:
Vickers Petroleum Co.'s No. 1 Kerr, NW SE Sec. 15-16-12w	Drlg. 1,500 ft.
Rankin's No. 1 Soocy, C SW NE Sec. 34-18-12w	Drlg. 625 ft.
Doherty et al's No. 1 Roesler, SW NE Sec. 11-18-11w	S.D. 1,975 ft.
Skelton Oil Co.'s No. 1 Ott, C SE SE Sec. 16-19-14w	Set liner 3,530-44 ft., show oil. S.D. 3,605 ft.

BUTLER COUNTY

Reeser's No. 1 Hull, NW SE Sec. 8-26-9	Fishing 735 ft.

ELLIS COUNTY

Phillips Pet. Co.'s No. 1 Unknown, C SW Sec. 33-11-17w	Location.

ELLSWORTH COUNTY

Sinclair Prairie and Olson's No. 1 Brack, C SW SW Sec. 17-14-10w	T.D. 3,358 ft.; S.D.
Rex Etnyre's No. 1 Arnsman, C SW SW Sec. 10-15-7w	Rig.
Buckford's No. 1 Burke, C NE SW Sec. 14-14-9w	S.D. 50 ft
R. Gear et al's No. 1 Kroboth, SE NW Sec. 12-15-10w	Sil. 3,209-16 ft.; wtr.; abd.

GRAHAM COUNTY

Schleimeyer et al's No. 1 Smith, SE Sec. 24-8-25w	Drlg. 3,926 ft.

GREENWOOD COUNTY

Knight et al's No. 1 Moser, NE SW SW Sec. 33-22-12	Machine.

HARVEY COUNTY

Phillips Pet. Co.'s No. 1 Weeba, NE SE NE Sec. 20-23-2	S.D. 2,975 ft.

MARION COUNTY

Farrell et al's No. 1 Williamson, C NW SE Sec. 21-19-4	Drlg. 2,667 ft.

McPHERSON COUNTY

Lario O. & G. Co.'s No. 1 Wilke, C SE NE Sec. 24-20-4w	Drlg. 2,400 ft.
Whan et al's No. 1 Nelson, NW SE Section 18-19-2w	Location.

(Continued on Page 86)

SALESMAN INJURED FATALLY

C. J. Anderson, aged 40, of Tulsa, Mid-Continent sales representative of A. Leschen & Sons Rope Co., was injured fatally when his automobile ran off a bridge while he was returning home from a business trip in Oklahoma City, Okla.

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CORPORATION
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Humble Opens New Serpentine Pool in Bastrop County, Texas, With 78-Bbls. Hourly Well

By B. D. STEVENSON
Staff Correspondent, Southwest Texas Fields

SAN ANTONIO, Tex., Feb. 20.—Humble Oil & Refining Co. opened a new Serpentine pool in Bastrop County last week when it completed No. 1 Annie Hassler which when pinched to one-eighth-inch choke flowed 7½ bbls. hourly. It came in flowing 57 bbls. the first hour and 78 bbls. hourly after that till pinched down. It is in Serpentine from 2,468-2,577 feet.

Counting big and little propositions this is the tenth Serpentine pool along the Balcones fault zone. Later in the week when the Humble well was pinched to three-sixty-fourths-inch it was flowing at the rate of 6 bbls. per hour.

Humble has made location for No. 1 Betty White, about 2 miles southeast of No. 1 Annie Hassler and due to leases having short time to run will have about two rigs running in the field. Humble owns the bulk of the acreage that will probably be productive but The Texas Company owns a little and some Sun Oil Co. acreage is not far away.

Speculation on the probable size of the pool fixes it at something less than that of the Lytton Springs Pool which thus far has been the best Serpentine pool discovered though the Chapman Pool in Williamson County may eventually prove nearly as good. Other than the Thrall Pool and a few spots where Serpentine production has been found but not developed the total production of the Serpentine pools down to December 31, 1932, was as follows:

	Bbls.
Chapman	2,146,129
Dale	242,063
Yost	144,378
Lytton Springs	6,334,980
Total	9,271,050

Figures for Dale include the Buchanan Pool and those for Yost include the Schimmel Pool which is nearby. Parsons & Mayfield's No. 1 Carroll estate, located on Sun acreage about 2 miles southwest of the new Humble strike, and Ogden & Reed's No. 1 Riddle about 2 miles north of the Dale Field, each of which thus far consists of but one well makes up the total of 10 places where Serpentine production has been found. Total figures for Thrall are not available but it has produced a total of about 3,000,000 bbls.

Laurel Pool—Webb County

In the Laurel Pool in Webb County, Parr Oil Co.'s test, more than a half mile south and a full half mile west of nearest production in the field, came in a dry gas well in sand at 2,119-28 feet, the regular sand of the field, estimated at around 5,000,000 feet of gas with 650 pounds pressure.

This is at the south end of the field, the well being 330 feet from the south and east lines of Survey No. 272 and the Magnolia has the offset acreage to the east and Reward Oil Co. offset acreage on the south. Dyck Oil Co. a few weeks ago brought in No. 1 Garcia & Villareal northeast of it for around 1,500 bbls. a day at the same depth but the No. 2 west of it was small and the Reward Oil Co.'s No. 1 Laurel, a north offset to Dyck's No. 2, was also small which made the territory to the west look a little doubtful. This half-mile extension to the southwest even though a gas well and small seems to indicate some further extension possibilities of the oil area to the south.

Magnolia has made three new locations in this Dyck extension to the field. Magnolia's No. 1 Garcia & Villareal came in a few weeks ago an east offset to the Dyck Oil Co.'s No. 1. Magnolia's No. 2 is an east offset to No. 1, and No. 3 is a south offset to No. 2, and No. 4 a south offset to No. 1. Dyck Oil Co. has made location for its No. 3, a south offset to its No. 2. These locations will start the field to moving to the south.

There has been considerable inquiry for royalty in this new field with its high gravity oil ranging around 48 degrees A.P.I. Phillip Rosenberg, who discovered the field, owns all of Survey No. 271 in fee and considerable additional acreage in fee. Tidal Oil Co. bought one-eighth under all of Surveys 1,100, 1,099, 720 and 338, prior to the discovery of the field and prior to the land being leased. Some of the royalty under Survey No. 1,100 with the Dyck Oil Co.'s No. 1 Garcia & Villareal, a big well near the center of the north line of the survey and the Parr gasser offsetting about the center of the west line of the survey is held by O. W. Killam and Garcia & Villareal. Outside of the Magnolia and Tidal and a little off at the east edge by the Shell, major companies seem not to be represented in the field.

One of the chief interests in this field is still the Smith & Storey well in Survey No. 23, about 3,500 feet north and slightly east of nearest production which should with constant drilling be in the sand early this week.

An important wildcat test is being started by Earl Calloway and others between the Carolina-Texas Field and the old Leaseholders Pool, so-called. It has never developed into a pool though a number of tests were drilled each of which got a little oil at shallow depth. Tests in the Leaseholders Pool are located in Section 19 of Block 1, of C.C.S.D.&R.G. N.G.R.R. Co. Survey, 5 miles east and 11 miles north of the Carolina-Texas Pool and about 5 miles due south of the new Moca Pool. The Calloway location is following up the trend theory that has already resulted in many pools being discovered in the Laredo district.

Saxet Field in Nueces

One of the most important developments of the week in Southwest Texas is the completion of the Houston Oil Co.'s No. 2 McGregor in the northwestern part of the Saxet Field in sand at 4,860-76 feet and said to be around 500 bbls. daily but thought by many to be good for more than that. It is the farthest northeast producer in the field and producing from the deepest sand with only a few other tests in that sand. The nearest test in that sand is Hillegeist's No. 1 McGregor about 1,000 feet southeast of it but the Gibson Oil Co.'s No. 1 Rand Morgan producing in that sand is 2 miles southwest and the Oso Drillers' No. 3 Roark which came in for gas and making a little oil in that sand and now being deepened a little is 2 miles east. Other wells in between are producing at around 4,100 feet, 4,500 feet and some of the first wells at about 2,500 feet, and two or three at 4,300 feet.

Nueces Wildcat

John F. Camp is starting No. 1 King in Section No. 29 of the Richard King Survey and the third well in the King Field in western Nueces County. Last year Camp and Stanolind Oil & Gas Co. drilled No. 1 King in the NW cor. Section 23 of that subdivision and got a big nogauged gas well at 3,893-99 feet and then drilled No. 2 in the southeast corner of the same section and passed up the first sand and got a gas well in sand at 4,010-30 feet. Camp's new location in Section 29 is 150 feet from the north and west lines of the E half Section 29 and the NW cor. Section 29 joins the SE cor. of Section 23. It is following the rule to move down the dip in the hope of getting oil production.

Other than this and a new test starting near the Kingsville Field in Kleberg County almost all of the drilling activity in the coast territory is in the proven fields.

During the past week the Carsil Oil & Gas Co.'s gas well on the McGill land in northern Jim Wells County which was completed in wildcat territory more than a year ago was opened and made considerable distillate. The plan is to open it again at intervals.

Humble Oil & Refining Co. last week at 5,247 feet abandoned its No. 1 Fuhrkin in the Phillip Sack Survey in the northeastern part of the county. This would leave the county without any activity but the Magnolia Petroleum Co. has made location for another test on the Seeligson land in the southern part of the county, where the company last year drilled a deep test that attracted considerable attention. It is on a big block of acreage acquired originally by the Vacuum and later in the merger turned to the Magnolia. The new location is 150 feet north of the south line and 3,000 feet west of the east line of V. Canales Survey No. 218 which is approximately the center of the survey, east and west.

North Government Wells

Navarro Oil Co.'s No. 1 C. W. Hahl in Survey 360 in Duval County extended the North Government Wells Pool about 700 feet to the north and came in for 200 bbls. a day. It is not as big as some. It is a north offset to The Texas Company's No. 3 Wendt in Survey No. 42 which came in for 20 bbls. per hour, both wells being 2,290 feet, total depth. The Navarro well is on acreage originally taken by Humble Oil & Refining Co.

Another good completion was Windsor Oil Co.'s No. 3 Cummings, 330 feet from the north and east lines of the northwest of northeast of Survey No. 44 and pretty well to the eastern edge of the field which came in for an estimated 1,500 bbls. per day at 2,295 feet.

The interest in Duval County is centered in the further development of the two new pools discovered and in the wildcatting up through McMullen County.

Shasta Oil Co. bought the Smith & Capps half interest in No. 1 Peters and the block of 1,280 acres around it and are starting the next test. Smith & Capps' No. 1 Peters, it will be remembered, was brought in a gas well at a little below 2,400 feet and in the Government Wells sand in Survey 178 about 7 miles southwest of the Sarnosa Pool, and 2 miles north and 1 mile east of nearest production at around 1,780 feet in the Kohler Field. One-quarter interest in the deal is owned by Highland Oil Co. and the other quarter by individuals. Highland Oil Co. also owns quite a lot of royalty under the block.

Acreage for the first well was given by The Texas Company and Humble Oil & Refining Co. and these own most of the acreage around not held by Shasta.

The interest now centers on the next well which is No. 1-B Peters, 990 feet from the west line and 330 feet from the north line of the northwest of the southwest of Survey 176 which makes it 1,330 feet due east of the discovery gas well. It is just getting started but with constant drilling can be down to the sand in a week and everything depends on whether it makes gas or oil.

The other new proposition is the Smith & Hunter (first carried as Stanley Smith) No. 1 Pena, 7 miles east of the North Government Wells Pool which came in a gas well at a little below 1,900 feet. They have moved to the southeast for their second test which is the No. 1 Olivarez in Survey No. 80. There is expectant waiting for the outcome of it. This well is producing in the Frio, locally called the Cole sand and the Government Wells production is in the Fayette, a formation below the Frio. Smith & Hunter have chances at several sands below their gas well depth.

Of the wildcats the S.R.C. Oil Co.'s No. 1 Hagist was coring for the Cole sand late last week, the location being in the southeast corner of Survey No. 267 and several miles due north of the North Government Wells Pool. This is one of the most watched wildcats in that part of the country because a test in the same survey some months ago got quite a lot of gas in the Cole sand and there is the expectation that the new location will get oil.

Three wildcats in southern McMullen County along the same lines of play extending up from Duval County are getting started. Gant & Teas' No. 1 Hagist, on Section 24; S.R.C. Oil Co.'s No. 1 La Chusa in A.B.&M. Survey No. 47; and Jaqua & Crow's No. 1 Hagist in Survey No. 467 are all well started and another week will tell much concerning them.

Wildcat Operations in Southwest Texas

Week Ending February 18

ARANSAS COUNTY

Company, farm and location—	Remarks:
F. R. Kestler's No. 1 McCampbell, 180 ft. from N and E lines of Lot 1, Blk. 54, McCampbell ranch	T.D. 4,900 ft; drlg.

ATASCOSA COUNTY

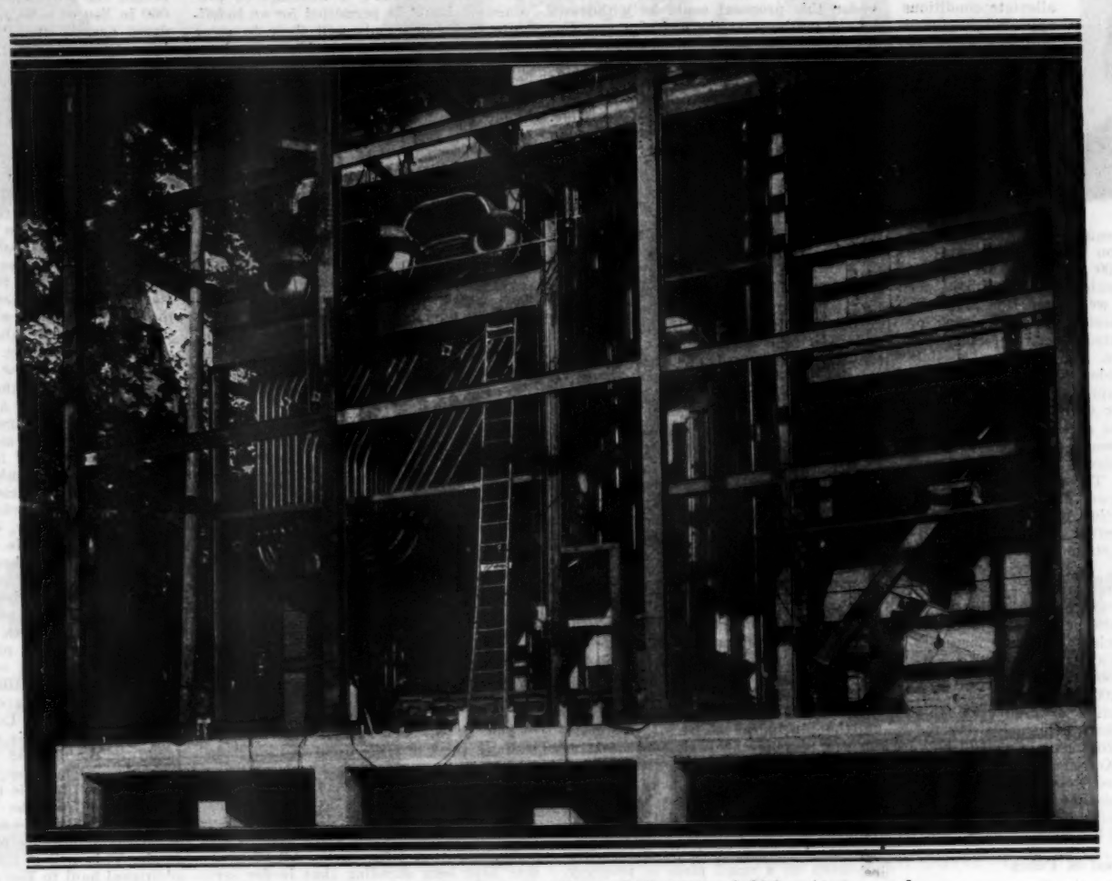
Jacob, Buzzini & Pickett's No. 1 Roundtree, 330 ft. from NE and SE lines of W¼ of J. Pointevant Sur. 1.	T.D. 879 ft; waiting for fuel.
Stieren & Pickett's No. 1 Hurt & Tartt, 150 ft. from NE line, 450 ft. from NW line of J. Wilkinson No. 144 Sur.	T.D. 750 ft.; fishing.

BANDERA COUNTY

Van Winkle's No. 1 R. B. Watson, 660 ft. N of cen. of S line of Sec. 71	T.D. 400 ft; standing, showing gas; waiting for 10-in. csg.
H. A. Parkford's No. 1 Duke, 300 ft. from S line, 150 ft. from W line of Sec. 7, G.C.&S.F. Sur.	Comp. road and given 90 days' extension to Feb. 18.

(Continued on Page 88)

MORE POWER *to* De Pauw!



Erection view of 577 h. p., Class LE-676, Vogt water tube boiler at De Pauw University, Greencastle, Indiana.

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California Fears General Price Reduction There If Production Situation Is Not Improved

By L. P. STOCKMAN
Staff Correspondent, California Fields

LOS ANGELES, Calif., Feb. 18.—A general reduction in California crude oil prices or the adoption of some alternative which will alleviate conditions appeared imminent late this week, despite strenuous attempts to peg quotations at their present level and thus enhance curtailment. Marketers may possibly be able to maintain the existing crude oil price structure, but this will require Herculean efforts. State production has been averaging more than 20,000 bbls. in excess of the established allowable of 440,000 bbls. per day for several weeks and this, with the reduction in gasoline prices a week or so ago, has created a very unsettled condition. Operators, anticipating a possible reduction in crude prices, have shown a tendency to overproduce before the price cut comes rather than reduce production and eliminate the necessity of a price recession. As a result, a number of fields have been consistently exceeding their respective quotas. The situation has been further aggravated during the current week by the action of Kettleman Hills operators who refuse to observe curtailment unless all other fields in the state do likewise.

The Kettleman North Dome Association resumed production late this week and Kenda's action made it obligatory for the Union, Superior and other operators to follow a similar procedure. The Kettleman North Dome Field has a current allowable of 55,000 bbls. per day, but with the resumption of production this week, operators have arbitrarily reverted to the previous allotment of 60,000 bbls. per day. The Kettleman North Dome Field has a rated potential of 267,000 bbls. per day and this is expected to be increased by the completion of several new wells during the next 30 days.

Reversal of Policy

Reading between the lines, one seems to get the impression that operators holding acreage outside the unit plan have definitely decided to produce in excess of their allotted quota as long as the Kettleman North Dome Association chooses to do so. This is in direct opposition to the policy adopted October 1, 1932, when all other operators, with the exception of the association, accepted an additional curtailment of 10 per cent. For several weeks the association refused to effect the prescribed 10 per cent reduction in production and continued to produce on the basis of 60,000 bbls. per day, despite the fact that other operators in the field developing fee acreage effected the necessary reduction to conform with the field's reduced allotment of 54,000 bbls. per day, which the curtailment committee had established as the maximum for October, November and December, 1932.

Operators who are adhering to the curtailment program are wondering if Kenda's action in resuming production on the basis of 60,000 bbls. per day will precipitate a crisis, and if so, what the outcome will be. Marketers may be forced to adopt one of two alternatives. The most drastic and less desirable would be an obligatory reduction in crude prices and a corresponding recession in gasoline prices. A second alternative would result in the initiation of a compulsory storage program whereby producers would be obliged to store surplus production for a definite period. In conformity with this policy, producers would be given space in empty tanks at a cost of approximately 1 cent per barrel monthly. Oil stored under this proposal could be withdrawn by the producer at the end of a specified period, unless the storing company exercised an option to purchase it. A program of this nature could not be carried on indefinitely, however, due to the limited amount of suitable storage available. Of the two alternatives, the storage plan is the most desirable because it will permit the maintenance of existing crude prices and at the same time protect those operators who conform with curtailment.

Outlook Unfavorable

Ralph B. Lloyd, president of the Oil Producers Sales Agency of California, and chairman of the Executive Committee for Equitable Curtailment, summarized conditions at a meeting of the board of directors of the sales agency this week. Mr. Lloyd informed directors that "at no time in the past have conditions looked as black as they do today. Voluntary curtailment of crude oil production in California faces its gravest crisis. A small number of operators in the Los Angeles Basin area persist in producing above the allowables fixed by the state oil umpire. As a result, disruption of the entire state program is threatened, and even a collapse of the present price structure grows constantly closer. Nothing is to be accomplished by specifically naming the individuals or companies who threaten to bring about an entire collapse of all the work that has been accomplished during the past three years. They are few in number and well known both within and without the oil industry. Agreement after agreement has been made among the majority of the independent oil producers and that includes the small producers, who are playing the game, only to find men in their own ranks selfishly refusing to participate.

"Time after time we have had demonstrated to us that one relatively small producer can disrupt the entire state's program. Allowing his wells to overproduce, even on a small piece of property, compels his neighbors to overproduce and they in turn compel adjoining properties to seek their share of production with the result that eventually the field's overproduction disrupts the state-wide program. However, if this great basic industry of the State of California should go to a 'wash-out'; if unhampered production should be permitted for an indefinite period, not only will there be great physical waste of a valuable natural resource through the destruction of oil properties that should be protected under a curtailment program; but many of the companies now operating will find themselves in the hands of receivers or in bankruptcy. No one can prophesy the effect of such a condition upon all lines of business in the state.

"No good can be accomplished by such a procedure, for with unrestrained production for a period of time at the end of that period we will be faced with the same condition that exists today. Production capacity at the conclusion of that period would be far in excess of market demands and the job would have to be started all over again. If gasoline prices are continued at their present unprofitable level, a cut in the price of crude oil is bound to follow. There will be no increased demand for gasoline because the public has no money with which to buy. Consumption of gasoline is declining steadily because of this fact, combined with high taxes on each gallon sold. The time has come for us to face the fact of whether we want industry gainfully occupied, and men in employment, or bankruptcy prices with all that means. I have no sympathy with those companies that dump their excess gasoline, even under the protection of the courts, to the detriment of their own stockholders, their competitors, the oil industry and every business directly or indirectly affiliated with it."

Recover Wells

The U. S. Navy has taken over 18 wells in the Elk Hills Field of California which it was awarded after extensive litigation with the Pan American Petroleum Co. The 18 wells are in Sections 1 and 2 in Township 31s, Range 24e. Lease E includes seven wells, lease G six wells, and lease I five wells. All 18 projects have been standing shut in for several years due to litigation. The Senate Public Lands Committee recently approved a resolution to adjudicate the claims arising from the production of these wells during the early period of the litigation. The resolution on which U. S. Senator Nye will seek early action will permit the government to accept $5,000,000 in lieu of a $9,277,066 judgment rendered against the Pan American Petroleum Co. and the Richfield Oil Co. of California.

Submarine Pipe Line

The Standard Oil Co. is making good progress with the submarine pipe line which it is laying from the company's El Segundo refinery to a point approximately 3,400 feet out in the open ocean. The installation of this pipe line, which will be 16 inches in diameter, will cost approximately $175,000, and should be completed some time during the latter part of April. The Standard's new submarine line will extend from the end of the present loading wharf at El Segundo for a distance of about 3,200 feet and terminate in 50 feet of water. The installation of this new line, which will be securely anchored and equipped with a flexible rubber hose at the seaward end, will permit the company to load tankers or receive cargoes moved in by tanker from other fields of the state. Upon the completion of this submarine, the Standard will escape payment of port charges at Los Angeles Harbor. The Standard's El Segundo refinery, constructed a number of years ago, is so located that it necessitated double handling of oil as refined products had to be pumped down to Los Angeles Harbor to the company's docks, from which point it was loaded aboard tankers. With the completion of the new submarine pipe line at El Segundo, the company will be able to discharge Kettleman Hills crude at El Segundo without being obliged to use pipe line facilities from Los Angeles Harbor to the refinery. This new line will also facilitate the loading of fuel oil at El Segundo. Under the new hookup the Standard will be able to move Kettleman Hills crude from the field to tidewater at Estero and thence southward by tanker to the submarine pipe line at El Segundo. This will eliminate several miles additional haul to Los Angeles Harbor.

Lost Hills-Belridge

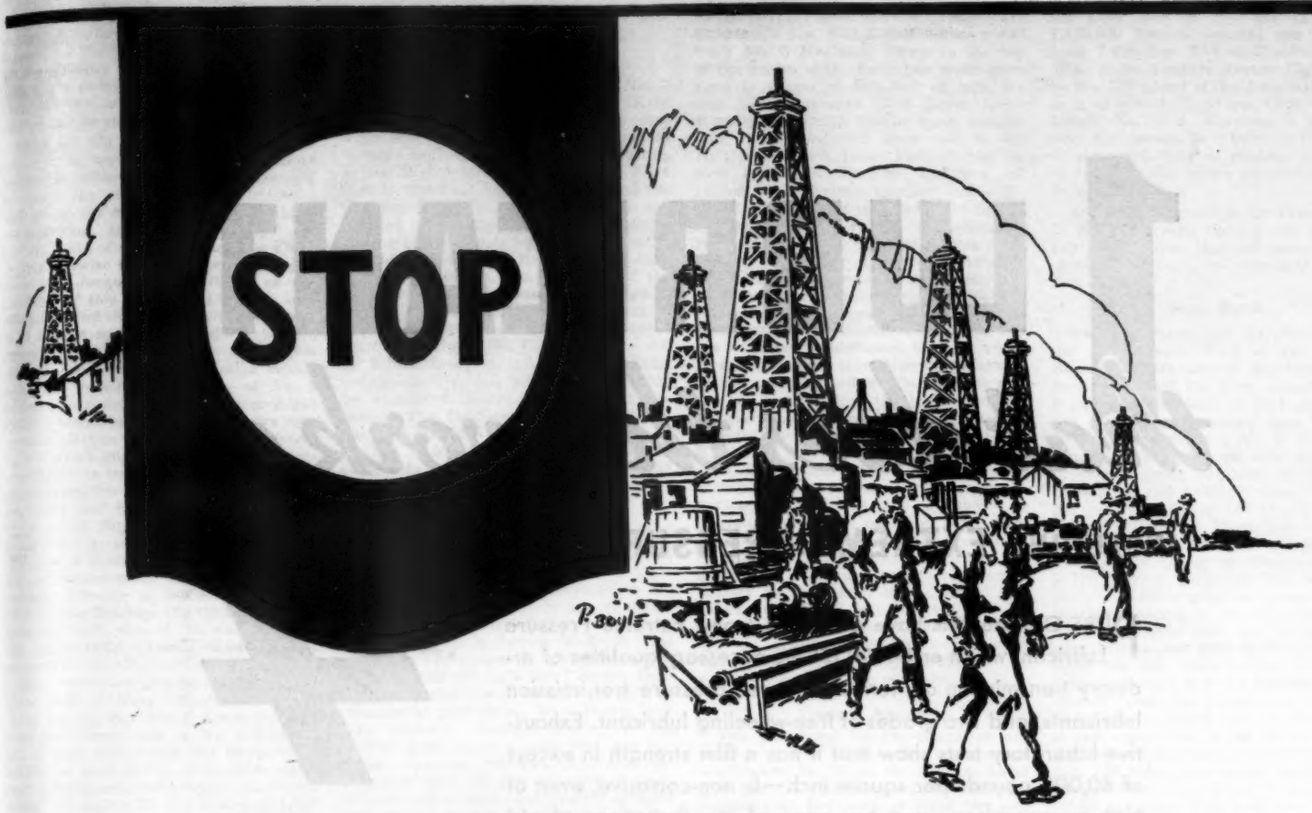
The Ohio Oil Co. has definitely cored the Wagonwheel zone in the North Belridge Field of Kern County and preparations are being made to land a string of casing preliminary to conducting an early production test. Ohio has cored approximately 100 feet of exceptionally well saturated oil sand in No. 1 Bloemer and the outlook is unusually good for a successful completion. No. 1 Bloemer, bottomed at 8,525 feet, is approximately 800 feet lower structurally than Belridge Oil Co.'s discovery, No. 64-27, which was finished at 8,062 feet. The saturated condition of the oil sand found justifies expectation of commercial production. The most significant feature is that it may necessitate drilling of 10 offsets on adjacent acreage which might seriously threaten any constructive movement to improve conditions in the industry. This field could become a factor of considerable importance within four or five months because it would not require more than 90 days to carry a number of present Temblor producers to the Wagonwheel zone. Practically all recent completions in the North Belridge Field have been finished with pipe large enough to permit deepening operations. If Ohio Oil Co. shuts in No. 1 Bloemer immediately on completion there will be no cause for alarm, but, if it permits the well to pro-

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	February 4		January 28			
Intercoastal-domestic—	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Fuel oil	.....	.....	.....	.....	74,775	.....
Diesel and gas oil	77,281	11,040	267,956	38,279	521,454	.....
Gasoline	297,410	42,487	116,931	16,704	805,972	585,984
Kerosene	.....	.....	.....	.....	250,130	.....
Foreign exports—						
Crude oil	386,726	40,961	280,596	40,085	781,518	945,816
Fuel oil	149,652	21,379	70,676	10,097	850,511	949,384
Diesel and gas oil	45,639	9,377	84,959	12,137	383,045	133,065
Gasoline	107,562	15,366	166,307	23,758	677,396	1,024,074
Kerosene	132,788	18,970	58,823	8,403	266,841	242,402
Naphtha distillates	.....	.....	.....	.....	.....	41,175
Coastwise-domestic—						
Crude oil	62,831	8,976	225,924	32,275	926,503	1,822,754
Fuel oil	252,062	36,009	302,353	43,193	1,133,704	1,792,507
Diesel and gas oil	7,661	1,094	6,536	934	169,339	245,849
Gasoline	173,424	24,776	291,626	41,661	1,145,492	1,147,495
Kerosene	1,058	151	.....	.....	17,754	16,527
Naphtha distillates	.....	.....	.....	.....	27,651	.....

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	99,426	14,204	203,476	.....
Kerosene	.....	.....	.....	.....	154,070	.....
Foreign exports—						
Crude oil	.....	.....	156,073	22,296	156,073	87,325
Fuel oil	.....	.....	61,884	8,841	129,709	380,408
Diesel and gas oil	6,075	868	114,709	16,387	155,252	110,462
Gasoline	14,736	2,105	197,503	28,215	595,286	415,886
Kerosene	.....	.....	90,635	12,946	139,142	185,350
Lubricants	.....	.....	10,847	1,550	13,072	8,225
Coastwise-domestic—						
Fuel oil	107,541	15,363	.....	.....	234,239	316,072
Diesel and gas oil	.....	.....	.....	.....	17,467	116,819
Gasoline	88,223	12,603	30,114	4,302	325,782	561,210
Kerosene	.....	.....	2,893	413	14,953	10,857



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3. For Any Type Free-Wheeling Unit
4. For Any Type Tryon Shackle

Jobbers, ordering now for spring and summer lubrication jobs, can reduce the number of lubricants which a service station must stock, by selling this single 4-way lubricant. Available immediately, in any quantity, in plain cans or bearing your brand name. Phone, write or wire nearest office for prices and further particulars.

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duce other operators will be obliged to engage in offset drilling. Operators interested in the North Belridge Field, and in the stability of the industry in California, are endeavoring to work out some plan whereby drilling and production activities can be restricted to a minimum.

Ohio Oil Co.'s No. 1 Bloemer may prove to be an important factor before before the close of the year, because if it results in commercial production it will reveal the existence of a substantial accumulation and greatly enlarge the proven limits of the North Belridge Field. It may likewise stimulate deep drilling in other San Joaquin Valley fields, as the finishing of this well would tend to corroborate belief that the Wagonwheel zone is of Eocene age, as originally expressed subsequent to the completion of the Belridge Oil Co.'s original completion in this zone. The possible completion of No. 1 Bloemer as a substantial producer might revive interest in the California gas conservation law as this is the only existing statute which might be employed to force a reduction in production. The California gas conservation law is still on the statute books and has been upheld in part by the U. S. Supreme Court, which recognized the correlative rights of all producers in a common pool. Application of the gas conservation law would be particularly effective in the North Belridge Field as the Belridge Oil Co.'s deep zone discovery well showed an exceptionally high gas-oil ratio, a condition particularly susceptible to effective enforcement of a gas conservation measure. In the Lost Hills Field of Kern County, the Associated Oil Co. has found it necessary to make four cement jobs on No. 1 Williamson, a deep test which the company is drilling in conjunction with other operators holding adjacent acreage. The fourth cement job on the 22-inch landed at 1,992 feet will be drilled out and tested some time during the next few days. Approximately 3,000 sacks of cement have been used in an effort to effect a satisfactory water shutoff. The outcome of the fourth cement job should be determined during the coming week.

Buttonwillow

The Milham Exploration Co. completed No. 3 Whitaker, a new well in the Buttonwillow gas field of Kern County flowing 13,175,000 feet of gas per day from 2,550 feet, the hole having been finished with a 6⅝-inch liner including 185 feet of perforated. The Milham's new completion was finished in the second gas zone and is standing shut in under a pressure of approximately 900 pounds. It is believed the Milham interests will retard drilling operations in the Buttonwillow Field to some extent during the next several months, as there should be no need for this gas during the coming summer months, and also because the company has built up a potential large enough to meet any emergency which might arise during the winter months of 1933. It is possible, however, that the company will drill a deep test to determine the possibility of developing lower productive horizons. Three productive gas zones have been discovered in the Buttonwillow Field and one or more additional productive zones may be anticipated.

Mount Poso

The Shell Oil Co. spudded in No. 3 Glide in the Mount Poso Field of Kern County early in the week and two other wells now being rigged up are expected to begin making hole in the near future. In the Round Mountain district of Kern County, the Petroleum Securities and the Chanslor-Canfield Midway Oil Co. are engaged in friendly competition to determine which of their respective potential producers will be the first to go on commercial production. No. 4 Coffee of the Petroleum Securities has a slight edge as this well is being reamed preparatory to landing the water string. The Chanslor-Canfield Midway Oil Co.'s No. 6 is not far behind, however, and unless something unforeseen develops, both projects should be completed before the close of the month. The California Western Oil Co. has experienced a little water trouble in its No. 11 at Round Mountain and was obliged to effect a recement job on the 10¾-inch casing landed at 1,628 feet.

Weed Patch

The Mohawk Petroleum Co. has decided to make another bid for production in the Weed Patch, or Mountain View Field, of Kern County, discovered by the Shell Oil Co. several years ago. Mohawk is rigging up rotary drilling equipment in No. 1 Hood, in Section 30-30-29. This project is approximately 3,000 feet northwest of Shell Oil Co.'s No. 1 Porter Day, which revealed the probable existence of commercial production. No. 1 Porter Day was originally finished flowing at the rate of approximately 2,500 bbls. per day a few years ago but was killed and carried down to 8,420 feet in search of deeper production. Shell subsequently plugged back No. 1 Porter Day but was unsuccessful in finishing it as a commercial producer. The well has been shut in for two years with padlocks on the heavy Christmas tree and several leases in the Weed Patch area have been acquired during the past few months by Shell, Taft Well Drilling Co., A. T. Jergins and Dana Hogan. North American Consolidated completed No. 25 in the Buena Vista Hills section of the Midway-Sunset Field during the week, but this new producer was good for only 105 bbls. of 24.2 gravity oil per day from 4,745 feet.

Kettleman Hills

A check of development work under way in the Kettleman Hills Field indicates probable completion of several potential producers during the next 30 or 60 days. One is No. 3 Amerada King of the Union Oil Co., which late this week was in hard brown shale at 7,304 feet. Progress on this well has been rather slow but faster drilling will be possible after the bit has passed through the brown shale, which in this field is harder than any other formation. The Standard and the Superior have been making exceptionally fast hole in two wells which they are drilling in the North Dome at Kettleman Hills and the bit in both projects is rotating at about the same level. These two wells, which are racing down to the pay, for some unknown reason, are Standard's No. 8-21-J and Superior Oil Co.'s No. 6 Huffman. Down to the top of the brown shale, these two wells averaged in excess of 500 feet of hole per day. The Kettleman Hills North Dome Royalty Syndicate should begin making hole in its projected deep test in the Kettleman North Dome Field during the next few days. Progress has been retarded by inclement weather and unfavorable condition of the roads. The Standard has resumed fishing operations in No. 6-29-V, which the company is drilling in the Middle Dome of Kettleman Hills, and it will be some time before the hole is properly conditioned. With the first of March immediately ahead, the Kettleman North Dome Association will not have much additional time in which to agree on the contraction or expansion of the area inclosed within the blue and the red lines. Under the by-laws of the association, the directors are obligated to relocate the blue and red lines in the Kettleman North Dome Field in March, 1933. The red line inclosing the proven acreage can be increased but cannot be contracted. The blue line is subject to changing conditions resulting from drilling operations and may be either enlarged or diminished. The North Kettleman Oil & Gas Co. effected a satisfactory water shutoff on the 7-inch casing landed and cemented at 9,638 feet, but since no oil or gas was in evidence on the water shutoff test, drilling operations were temporarily suspended pending the delivery of a new string of 3-inch drill pipe.

Ventura Avenue

The Associated Oil Co. completed another new well in the Ventura Avenue Field when No. 21 on the Ventura Land & Water Co.'s property was given a production test. Bottomed at 7,125 feet and finished with a 6⅝-inch perforated liner and an 8⅝-inch flow string landed at 6,220 feet, it was brought in flowing 888 bbls. of 26.8 gravity oil and 1,400,000 feet of natural gas per day through a forty-eight-sixty-fourths-inch bean. A week or so ago the Associated completed No. 26 Ventura Land & Water Co. flowing 1,037 bbls. of 29.2 gravity oil and 1,125,000 feet of natural gas per day from 7,498 feet. The next potential producer in the Ventura Avenue Field should be No. 130 Lloyd of the Associated, which is in oil sand at 7,580 feet. General Petroleum's No. 15-A Barnard, a projected deep test, passed the 6,000-foot level early in the week but has another 2,000 feet of hole to make before completion in the lower 57 zone.

Although operators in the Elwood Field of Santa Barbara County are not doing any new drilling, they are reconditioning present producers to stimulate production.

Long Beach

Two wells were put on production in the Long Beach Field of Los Angeles Basin and both showed satisfactory production. Pernell Oil Corp. completed No. 1 pumping 340 bbls. of 26.1 gravity oil per day from the upper zone at 4,960 feet. Exeter Oil Co.'s No. 1 Noll, a recompletion at 4,936 feet, was returned to production doing 321 bbls. of clean 27.9 gravity oil and 1,000,000 feet of natural gas per day. Union Oil Co. is starting a new well in the Playa Del Rey Field and the rig for this new project, No. 3 Vidor, is in course of construction. No. 5 Del Rey, a projected deep zone completion, is being redrilled preparatory to landing a string of casing a little above bottom at 5,844 feet. The Union is also starting one new well in the Dominguez Field but this work is due to lease requirements and does not indicate any deviation from the program of restricted development. Sierra Oil Co. chalked up a new completion in the Playa Del Rey Field this week, but the initial daily output, 110 bbls., was rather unsatisfactory as it showed a water cut of approximately 30 per cent. This well was bottomed at 4,772 feet and finished in the upper zone with a 4¾-inch perforated liner. Southern California Drilling Co., which finished No. 1 Severns as a commercial producer a week or two ago, has recompleted No. 1-A Riggle pumping 115 bbls. of 21.6 gravity oil per day from 3,738

(Continued on Page 82)

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.	T.	R.	Depth	Status—
Hines Pet., No. 1 Ocean Park, Los Angeles Co.	8-	2-	15	7,414	suspended
Taylor Oil Co., No. 1 Culver, Los Angeles Co.	12-	2-	15	6,238	suspended
Palm Ridge Oil Co., No. 1 Palms, Los Angeles Co.	2-	2-	15	3,401	suspended
Williams Oil Co., No. 1 Moneta, Los Angeles Co.	23-	3-	14	rig	suspended
Pan Tex Oil Co., No. 1 Lawndale, Los Angeles Co.	20-	3-	14	1,792	sd. sh. drilling
Baldwin Oil Co., No. 9 Inglewood, Los Angeles Co.	7-	2-	14	5,863	suspended
Kupfer, A. M., No. 1 Inglewood, Los Angeles Co.	17-	2-	14	4,090	suspended
Pacific Gulf, No. 1 Athens, Los Angeles Co.	19-	3-	13	4,860	gr. sd. drilling
Pacific Oil Inv. Co., No. 1 Wilmington, Los Angeles Co.	28-	4-	13	3,014	suspended
Wilmington Oil Co., No. 1 Wilmington, Los Angeles Co.	28-	4-	13	1,207	sd. sh. drilling
Jones, W. L., No. 1 Lyndwood, Los Angeles Co.	31-	2-	12	4,480	suspended
Hutcheson & Andrus, No. 1 El Monte, Los Angeles Co.	11-	1-	11	1,397	suspended
Willetts Pet., No. 1 Saugus, Los Angeles Co.	35-	5-	16	1,810	gas blowout
Smith, J. A., No. 1 Saugus, Los Angeles Co.	32-	5-	17	3,515	suspended
Alpha Oil Co., No. 1 Saugus, Los Angeles Co.	22-	1-	18	rig	rigging up
Hudson Pet., No. 1 Newhall, Los Angeles Co.	1-	3-	16	653	sd. sh. drilling
Garliepp, F. J., No. 1 Newhall, Los Angeles Co.	14-	3-	16	277	sd. drilling
Ball, W. T., No. 1 Newhall, Los Angeles Co.	34-	3-	16	3,582	suspended
Big Four Oil Co., No. 1 Newhall, Los Angeles Co.	32-	4-	16	1,700	sd. sh. drilinlg
Marble, Willard, No. 1 Van Nuys, Los Angeles Co.	6-	2-	16	1,981	gr. sd. drilling
Nuoli Co., No. 1 Newport, Orange Co.	29-	6-	10	3,410	br. sh. drilling
Mineral Exploration, No. 1 Capistrano, Orange Co.	8-	8-	7	4,283	cleaning out
Orangethorpe Pet., No. 1 Brea, Orange Co.	32-	3-	10	4,560	abandoned
Spindletop Oil Co., No. 1 Salton Sea, Riverside Co.	25-	7-	10	3,590	suspended
Keeley, H. J., No. 1 Corona, Riverside Co.	21-	4-	6	141	sd. sh. drilling
Duncan, N. L., No. 1 Sagebrush, Riverside Co.	8-	4-	6	1,157	suspended
Colan Dev. Co., No. 1 Redlands, San Bernardino Co.	25-	1-	2	2,392	suspended
Great American Pet., No. 1 Chino, San Bernardino Co.	18-	2-	8	1,509	rigging up
Mason Oil Co., No. 1 Salton Sea, Imperial Co.	1-17-15			680	suspended
Woods, D. H., No. 1 Salton Sea, Imperial Co.	7-11-16			774	suspended

IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S.	T.	R.	Depth	Status—
Meganos Oil Co., No. 1 Lompoc, Santa Barbara Co.	28-	8-	34	....	material
Smith, E. W., No. 1-A Purisima, Santa Barbara Co.	18-	7-	34	....	location
Duell, O. S., No. 1 Naples, Santa Barbara Co.	7-	4-	29	5,132	suspended
Equity Oil Co., No. 1 Coal Oil Point, Santa Barbara Co.	24-	4-	29	3,750	suspended
Bolsa Chica, No. 1 Coal Oil Point, Santa Barbara Co.	tideland			4,089	suspended
Bolsa Chica, No. 2 Coal Oil Point, Santa Barbara Co.	tideland			....	material
Cuyama Oil Co., No. 1 Cuyama, Santa Barbara Co.	12-	10-	27	2,387	suspended
Woodrow Pet., No. 1 Rincon, Ventura Co.	4-	3-	24	6,371	fishing
Indian Pet., No. 1 Rincon, Ventura Co.	tideland			3,115	rig to pump
Commander Oil Co., No. 1 Fillmore, Ventura Co.	13-	4-	19	2,254	suspended
Hancock Oil Co., No. 1 Fillmore, Ventura Co.	13-	4-	19	1,232	rigging up
Honolulu Consolidated, No. 1 Miguelito, Ventura Co.	23-	3-	24	4,660	sd. sh. drilling
Continental, No. 2 Miguelito, Ventura Co.	23-	3-	24	rig	rigging up
C.C.M.O., No. 3-A Miguelito, Ventura Co.	23-	3-	24	....	material
Macrate, A. N., No. 1 Ojai, Ventura Co.	27-	4-	23	1,711	sd."sh. drilling
Wilshire Oil Co., No. 1 Sulphur Mountain, Ventura Co.	20-	4-	21	1,601	cleaning out
Mosher, J. W., No. 1 Santa Paula, Ventura Co.	22-	4-	21	891	br. sh. drilling
Hardison & Temple, No. 1 Timber Canyon, Ventura Co.	22-	4-	21	248	suspended
Petro Producing Co., No. 1 Timber Canyon, Ventura Co.	18-	4-	20	2,482	cleaning out
Los Posas Pet., No. 1 Los Posas, Ventura Co.	22-	3-	20	671	sd. sh. drilling
Wilshire Oil Co., No. 1 Bardsdale, Ventura Co.	12-	3-	20	1,365	cleaning out
International Oil Developers, No. 1 Conejo, Ventura Co.	33-	2-	20	2,682	hd. sd. drilling
Anderson, C. L., No. 1 Santa Susana, Ventura Co.	36-	3-	18	371	sd. sh. drilling
Milham Exploration, No. 23 Buttonwillow, Kern Co.	8-	28-	23	2,550	13,000 M ft. gas
Purman, T. H., No. 1 Gould Hills, Kern Co.	22-	29-	21	5,399	recemented
Purman, T. H., No. 2 Gould Hills, Kern Co.	27-	29-	21	298	sd. sh. drilling
General Pet., No. 1 Belridge, Kern Co.	30-	28-	21	8,260	suspended
Cumberland Oil Co., No. 2 Devil's Den, Kern Co.	17-	26-	18	3,270	suspended
Holloway, A. S., No. 1 Devil's Den, Kern Co.	11-	25-	18	1,732	br. sh. drilling
Hanna, Tom, No. 1 Devil's Den, Kern Co.	25-	25-	18	3,516	suspended
Pyramid Hills Oil Co., No. 1 Devil's Den, Kern Co.	24-	25-	18	3,000	sd. sh. drilling
Fowler, F., No. 1 Blackwell Corner, Kern Co.	15-	26-	19	3,170	suspended
Ohio Oil Co., No. 1 Belridge, Kern Co.	26-	27-	20	8,520	oil sand
Associated, No. 1 Lost Hills, Kern Co.	2-	26-	20	1,998	recemented
Seminole Oil Co., No. 1 Lost Hills, Kern Co.	29-	25-	21	rig	suspended
Mohawk Pet., No. 1 Weed Patch, Kern Co.	30-	30-	29	rig	rigging up
Kingsburg Expl. Co., No. 1 Kingsburg, Fresno Co.	30-	16-	23	2,970	suspended
Bergman, Harry, No. 1 Kingsburg, Fresno Co.	12-	12-	11	1,411	sd. sh. drilling
Graham & Loftus, No. 1 Raisin City, Fresno Co.	20-	15-	18	3,560	cemented
Emerich Oil Co., No. 1 Mendota, Fresno Co.	35-	13-	13	....	material
Kent & McDonald, No. 1 Carrizo Plains, S. Luis Obispo Co.	3-	32-	22	3,815	cleaning out
Emerich Oil Co., No. 1 Carrizo Plains, S. Luis Obispo Co.	22-	32-	22	1,841	suspended
Texas Pacific Oil Co., No. 1 Edna, San Luis Obispo Co.	25-	32-	14	3,945	prod. test
Paso Robles Oil Co., No. 1 Edna, San Luis Obispo Co.	27-	27-	11	4,191	suspended
Shell, No. 1 San Miguel, San Luis Obispo Co.	4-	25-	12	5,060	sd. sh. drilling
Pacific Inland, well No. 1, Monterey Co.	19-	23-	15	2,441	suspended
Thomas Pet., No. 1 Parkfield, Monterey Co.	31-	22-	14	1,011	suspended
Guess, E. E., No. 1 Corcoran, Kings Co.	7-	21-	21	6,197	suspended
Brown, A. M., No. 1 Cloud, Kings Co.	10-	23-	19	mtl.	building rig
Dudley Dome Oil Co., No. 1 Dudley Ridge, Kings Co.	9-	22-	20	3,012	suspended
Knudsen & Schmidt, No. 1 Reef Ridge, Kings Co.	36-	23-	17	6,502	br. sh. drilling
Kettleman Ridge Oil Co., No. 1 Avenal, Kings Co.	10-	23-	16	rig	suspended
Magee & Stone, No. 1 Alpaugh, Kings Co.	34-	24-	22	5,060	suspended
Ducor Pet. Co., No. 1 Ducor, Tulare Co.	14-	24-	27	2,200	suspended
Inland Valley Oil Co., No. 1 Visalia, Tulare Co.	24-	17-	24	2,092	suspended
Ellis & Sanford, No. 1 Tulare Lake, Tulare Co.	20-	24-	23	1,490	suspended
Napa Oil Co., No. 1 Griffith, Napa Co.	7-	8-	3	3,273	suspended
Oakdale Oil Co., No. 1 Oakdale, Stanislaus Co.	5-	2-	10	4,813	suspended
Rushing Oil Co., No. 1 Waterford, Stanislaus Co.	20-	3-	13	2,653	sd. sh. drilling
Pacific Northern Oil Co., No. 1 Guinda, Yolo County	23-	12-	3	3,045	suspended
Buttes Oilfields Co., No. 1 Marysville, Sutter Co.	35-	16-	1	2,731	gas well
Tehama Pet. Co., well No. 1, Tehama Co.	4-	22-	15	2,040	hd. sd. drilling
Orland Synd., No. 1 Orland, Tehama Co.	31-	23-	3	3,404	sd. sh. drilling
Marker Drlg. Co., No. 1 Orland, Tehama Co.	21-	25-	3	3,030	cleaning out

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CITIES SERVICE OIL CO. (Wisconsin)	Milwaukee, Wisc.
CITIES SERVICE OIL CO., LTD.	Toronto, Ont., Canada
CITIES SERVICE REFINING COMPANY	Boston, Mass.
CITIES SERVICE EXPORT OIL CO.	New York, N. Y.
CREW LEVICK COMPANY	Philadelphia, Pa.
EMPIRE OIL AND REFINING COMPANY	Tulsa, Okla.
LOUISIANA OIL REFINING CORP. (LORECO petroleum products)	Shreveport, La.
A. R. NEWCOMBE OIL COMPANY	Kingston, N. Y.

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CITIES SERVICE REFINING CO.	East Braintree, Mass.
CREW LEVICK CO.	Petty Island, N. J.—Titusville, Pa.
EMPIRE OIL AND REFINING COMPANY	Ponca City, Okla. — Okmulgee, Okla. Gainesville, Texas—East Chicago, Ind.
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Indian Territory Illuminating Oil Company, a Cities Service subsidiary, is one of the major producing companies in the Mid-Continent field. It brought in the discovery well of the famous Oklahoma City field where it controls more than 50% of the production. Among other pools discovered by the I. T. I. O. are the Seminole, Little River, and Bowlegs pools. The fact that all these fields were discovered in areas that other companies had believed unproductive is typical of the far-sighted operations of the Cities Service organization.

Cities Service Oils and Gasolene

Hockley Dome Well Now Attracts Attention; Conroe District Has 100 Operating Rigs

By NEIL WILLIAMS
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., Feb. 20.—Interest on the Gulf Coast for the time being has been diverted from Conroe and the development of newer areas and trends to Hockley, one of the oldest known domes on the coast, where the completion late in the week of a 350-bbl. well gives indication of the opening of that dome's first production of consequence. The well is John Deering's No. 2 Warren, located on the northwest side of the dome in the T. Snell Survey, which is producing from a sand at 2,411-26 feet.

At this time it is difficult to foretell the importance of the discovery. The well came in Friday flowing at the rate of an estimated 500 bbls. daily after being bailed down 600 feet. After a few hours' flow it went dead but Saturday morning was bailed back in and at latest report was flowing an estimated 350 to 400 bbls. daily. However, the well has a pressure of only 20 to 25 pounds through a five-eighths inch choke and it may be that it will soon have to be pumped.

One joint, comprising 22 feet of 4½-inch screen, was set on the sand on bottom at 2,426 feet and 2½-inch tubing was run to the top. The sand is in the Oligocene and the oil is reported to be approximately 30 gravity although a definite gravity check is not available at this time. The first test (No. 1 Warren) drilled by John Deering and located only 100 feet northeast of the present producer, was abandoned because of stuck drill stem after being drilled only to a total depth of 2,411 feet.

One Other Well

At present there is one other well at Hockley, this being Adams, Smith & Zibley's No. 15 Warren, which pumps a small amount of oil. It is an old well, located on the northeast side of the dome, and was drilled by Texas Exploration Co., which originally completed it in February, 1924, in a sand at 2,052-90 feet. At that time it pumped at the rate of 75 bbls. daily of 22 gravity oil but quickly went to water and has not produced since until the present operators acquired the property and worked the hole over, making a small pumper. Another small well and a short life gasser also have been completed in the history of Hockley, the former being Texas Exploration Co.'s No. 13 Warren, 250 feet southwest of No. 15, and completed previously to the latter in 1923 from sand at 1,750-1,820 feet. The gasser was No. 2 Warren, drilled by the same company in 1919 or 1920 and which was completed in a sand at 1,986-92 feet.

Hockley is located in the extreme western portion of Harris County, and approximately 30 miles west of Houston. It is one of the innermost of the coastal domes but on a line with Humble.

Conroe Developments

Conroe continued to keep up the boom pace which it has set in development and the 100 operating rigs are resulting in a rapid proving of the productive territory. At the Railroad Commission hearing for that field held at Houston February 14 it was said that the active drilling would continue throughout the summer and that by next November the field would be practically drilled up with a total of approximately 650 wells, based on the present 20-acre spacing. It is quite likely that the Railroad Commission will follow the recommendations of the operators for an increase in the daily allowable from 18,500 to between 35,000 and 40,000 bbls. for the ensuing month, this allowable to be increased approximately 10,000 bbls. each month to a maximum of around 100,000 bbls. Engineers showed fairly conclusively that the field could be produced at these figures safely without waste. Nominations of the present three major purchasers for the remainder of February and March totaled 40,000 bbls. daily distributed as follows: The Texas Company, 10,000 bbls.; Tide Water Oil Co., 15,000 bbls., and Humble Oil & Refining Co., 15,000 bbls.

Edge of Production

Indications that the edge of production on the extreme southwest side of the field is about reached were given during the week in the completion of Strake Petroleum, Inc.'s No. 1 Keystone Mills, which at a total depth of 5,120 feet was below the water. The well came in making approximately 80 bbls., with 9 per cent water. It has been killed and now is plugging back. The plug back job will leave approximately only 15 feet of sand above the water, which will limit much more development in that direction. The limits of the field now have been pretty well determined except on the central east and on the extreme west.

M. J. Munn's No. 1 South Texas Development Co., located over a mile to the east of the field in the Clark Beach Survey, and which is an important key test in indicating the eastward trend, is down 5,050 feet but at latest report was making no hole. Strake Petroleum, Inc.'s No. 1 Elizabeth Moody, C. B. Stewart Survey, and a couple of miles west of production, at latest report was drilling below 4,900 feet. No definite information is available on this test but it is one of the most watched tests on the Gulf Coast at this time. Although generally it is looked upon as being entirely out of the Conroe picture, it is an important test whether it turn out dry or wet. If a producer it will open up a renewed play in the direction of the old Tamina district which now is just waiting for something to happen.

An important key test just starting at Conroe is Alpha Oil Co.'s No. 1 Thomas S. Falvey, located 466 feet out of the southeast corner of the G. Harris Survey. This location is nearly 2 miles south of production or the nearest development. Its chief hope of making a well is in the possible finding of down flank production in the upper Conroe sands and which over the main part of the field carry only gas. Such production has been found so far by Gulf Coast Drilling & Production Co.'s No. 1 Keystone Mills, A. S. James Survey, the present most southerly well, and South Gulf Oil Corp.'s No. 1 South Texas Development Co., the present most easterly well.

Location also has been made by Christie & Campbell for No. 1 Varner, which is located in the upper Ransom House Survey, over 2 miles west of production of the north part of the field. The location is 466 feet north of the south line of the survey and 158 feet west of the Houston-Conroe highway. It was just north of this location that Rowe & Flowers early this year drilled a dry hole below 6,000 feet.

Only six completions were reported for Conroe during the week, which was a sharp drop compared to the usual run of around 15 wells weekly. With the exception of the Strake well on the Keystone Mills lease, which was reported above as plugging off water, all completions were inside the present defined limits of production. The Strake well, although it was completed in the water and indicated the nearing limits of the field in that direction, marked a southwestward extension of production.

Rabbs Ridge

At Rabbs Ridge, Fort Bend County, Gulf Production Co.'s No. 1 A. Hammerstram extended production 2,200 feet northward when completed flowing 55 bbls. per hour through a three-eighths inch choke from a total depth of 5,398 feet. It is an east offset to H.M. Naylor's No. 1 Whitemore, which also has made some oil but which so far has not been completed satisfactorily, having made considerable water. Two other wells were completed in that field, these being Humble Oil & Refining Co.'s No. 4 Gubbels, located on the extreme east side and which made 43 bbls. per hour through a three-eighths inch choke at 5,310 feet, and Humble Oil & Refining Co. and Gulf Production Co.'s joint No. 7 Lockwood, which flowed at the rate of 67 bbls. per hour through a three-eighths inch choke with bottom at 5,300 feet.

Markham Field

E. M. Hamill and associates' No. 8 Meyers, east side of the Markham Field, Matagorda County, flowed 20 bbls. per hour through a quarter-inch choke with a pressure of 300 pounds with bottom of the hole at 3,395 feet.

Lockport

Magnolia Petroleum Co.'s No. 10 Bordages, Lockport, made an 800-bbl. well at 6,478 feet. The same company's No. 9 Farquahar at Lockport is in oil sand at 4,859-64 feet and has run casing to test. Both are on the west side of the field.

Ariola Dome

Another failure was chalked up for the Ariola Dome, Hardin County, in the abandonment of Houston Oil Co.'s No. 1-Y, which was dry in heaving shale at 5,948 feet. Ariola was opened for production during 1932 in the first test drilled, but so far the discovery well is the only one which has produced any oil. Four other deep tests have been drilled.

Jennings Field

Yount Lee Oil Co. also has quit its No. 11 Housierre-Latrielle, southeast side of the Jennings Field, it being dry at 8,550 feet. This is the second deepest test drilled at Jennings, The Texas Company having drilled a hole in the same area to a depth of 8,900 feet several years ago. Yount Lee Oil Co. has drilled a long list of deep tests at Jennings and obtained production in a 7,400-7,500-foot horizon from three wells although the remainder of the holes have been dry.

Montgomery County

R. L. Sprinkle's No. 1 Rohlfs, Prosens Survey, southern Montgomery County, was dry at 5,108 feet and has been abandoned. This is east of the deep test recently abandoned by Continental Oil Co. and Julius Fohs. Both are on the north side of what is called the Huffsmith area of northern Harris County and southern Montgomery County where an active wildcat leasing play has been under way for some time and which is now the most watched district on the coast. It has received considerable attention the past two weeks as a result of high prices being paid in cash for acreage. Stanolind Oil & Gas Co., which recently came into the Gulf Coast looking for leases and reserves, has paid $150 an acre for several pieces and is believed to have broken all price records for coastal wildcat acreage.

Harris County

Mills Bennett Production Co.'s No. 1 Klepple, March Survey, northern Harris County, at latest report was drilling in shale at 5,148 feet. The hole probably will be carried to 6,000 feet. Three miles east of this wildcat, Weatherall Production Co. of San Antonio is starting a test, its No. 1 Paden, in the Brock Survey.

Wharton County

Steed Production Co. has temporarily abandoned its No. 1 Lurker, first test on what is known as the Leech geophysical prospect, located in southern Wharton County. Bottom of the hole is 5,026 feet. This test had a sand showing oil at 4,270-75 feet but this was not considered thick enough to test.

Gulf Coast Fields and Wildcats

Week Ending February 18

RACCOON BEND—AUSTIN COUNTY

Company, farm and location—	Remarks:
Humble O. & R. Co.'s No. 9-A Walton, W. C. White Sur., 150 ft. SW of N cor. of 50-ac. tract and 181 ft. SE parallel to NE line	Drlg. shale 2,077 ft.
Humble O. & R. Co.'s No. 11 Woodley, Wm. Harvey Sur., 412 ft. out of S cor. of tract	Location.

DAMON MOUND—BRAZORIA COUNTY

Intercoastal Oil Co.'s No. 10 Wisdom, A. Darst Sur., 440 ft. from NW line, 170 ft. from SW line of tract	Heaving shale 3,978 ft; plugged back to test sand 3,534-40 ft.
A. W. Speed's No. 1 D. F. Bryan, A. Darst Sur., 105 ft. from N line, 65 ft. from W line of lease	S.D. 1,051 ft.
Sinclair Prairie Oil Co.'s No. 31-A Bryan, 155 ft. N 45 deg. E of SW cor. of Blk. 28, Masterson Subd., and 140 ft. S 45 deg. E of Elmire Bryan tract in A. Darst Sur.	No report.
Sinclair Prairie Oil Co.'s No. 10 Masterson (W.O.), A. Darst Sur.	Pulling screen to W.O. 3,206 ft.
H. Wisdom's No. 1 Wisdom, 50 ft. from SE line, 75 ft. from SW line of Blk. 5, Lot A, A. Darst Sur.	S.D. 1,045 ft.

MANVEL—BRAZORIA COUNTY

Alpha Oil Co.'s No. 1 W. H. Nichols, H. M. Little Sur., 300 ft. W. 300 ft. N of SE cor. of tract	Wtr. sand 5,330 ft; standing.
R. A. Gamble et al's No. 1 Sherwood, Lot 15, Allison-Richey Subd., H. N. Little Sur.	S.D. 4,125 ft.
The Texas Co.'s No. 4 Belcher, Harvey Little Sur., 2,900 ft. S, 42 deg. W, 490 ft. S, 48 deg. E, out of N cor. of lease	T.D. 3,890 ft; plugging back to shut off wtr.

WEST COLUMBIA—BRAZORIA COUNTY

The Texas Co.'s No. 12 Abrams (W.O.)	Old T.D. 3,024 ft; pulling screen to deepen.

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Failures and Locations in Miller County, Ark.; Mississippi Reports Heavy Oil Producer

By D. H. BANCROFT
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., Feb. 20.—Two more failures and two new locations in Miller County, Arkansas; a well producing heavy oil in the Jackson gas field of Mississippi as the sole successful completion listed, were the highlights of the week's developments in this area. Approximately half of the wells on the list are shut down due to roads made impassable by protracted wet weather and the ice and sleet storms of the week before making it impossible to get fuel to the rigs, most of which are using oil.

Of the 20 completions listed, 8 were in Louisiana, 3 in Arkansas, 6 in East Texas border counties and 3 in Mississippi. Five of those in Louisiana were abandoned locations or derricks in Sabine Parish, where three others were failures. Two of Arkansas' three were a junked hole and a dry test in Miller County and the other an abandoned derrick in Lafayette County. About half of East Texas' completions were Shelby County wells dropped from the report after a long period of inactivity. Harrison County had two failures and Marion County one. Beside the producer in the Rankin County side of the Mississippi gas field, another one the Hinds County side was a junked hole while the third was a wildcat in Sunflower County.

The seven new locations were divided—three in Zwolle, one in Lafayette County, Arkansas; a new one in Marion County, Texas, and resumption of activity on an old well in Shelby County, abandoned last October, and a new location in Hinds County, Mississippi.

NORTH LOUISIANA

Pat Marr's No. 1 Caldwell, SW NE Section 23-16-5, Bienville Parish, is holding considerable attention because of the way it has been checking with other wells in the vicinity, and particularly since it was coring what was thought to be the Blossom cap at 3,090 feet. Its correlation with these other wells has been rather puzzling because of its erratic showings, high on one formation, low on another. In DeSoto Parish, Mrs. A. L. Iback's No. 1 Rambin, NE NE Section 32-11-11, is shut down at 2,892 feet in sandy shale with streaks of sand showing oil. E. T. Oaks' deep test, No. 1 Bryant, NE NW Section 30-13-15, is shut down in shale and lime at 4,584 feet where it made a small show of gas. Jack Whitson's No. 1 Sanders, SW SW Section 19-11-13, the first well in this territory to try acid treatment (at a higher level) is shut down for fuel at 2,860 feet with 250 feet of oil in the hole. Location is in the Benson area of the parish about half way between Mansfield and Converse, Sabine Parish.

Southern Carbon Co.'s No. 15 Fairbanks, NE NE Section 5-19-4, Ouachita Parish, which ran into some wild gas, blew out and caught fire at 770 feet last week, burned itself out and is repairing rig. In Union Parish, E. S. Goens' No. 1 Frost Lumber Co., SE SE Section 7-22-2e, another Monroe Field wildcat, topped the chalk at 2,066 feet, claims a show of gas and is arranging for drill stem test at 2,092 feet.

Evans Brothers were bailing a show of oil at 1,547 feet on No. 1 Cranford, SE SE Section 20-19-13, about half way between the two producers in the Converse district of Sabine Parish. G. E. Jordan's No. 1 Dew, SW SE Section 34-8-11, Zwolle, bailed 25 bbls. oil, made two heads but would not flow and is setting tubing at 2,635 feet. Perkins & Babbin's No. 1 Hopkins, Section 11-7-11, is shut down with 2,300 feet of oil in the hole from 2,600 feet, waiting orders. Sam Riggs used acid on No. 1 Darby, NE SE Section 21-7-11, bailed dry and is waiting orders at 2,556 feet. Rotary Oil Corp.'s No. 1 Hale, Section 1-7-13, also used acid without results, twice, and is waiting orders at 2,440 feet.

Zwolle Area

Zwolle completions and abandonments were: Corporation Oil Co.'s No. 2 Eberle, SE SE Section 36-8-11, location; Pelican Natural Gas Co.'s No. 19 Louisiana Long Leaf Lumber Co., SW SE Section 33-8-11, dry and abandoned at 2,710 feet

Pugh-Hickman Drilling Co.'s No. 1 Blackman, NW SW Section 36-8-12, dry and abandoned at 2,575 feet; J. H. Watt and others' No. 1 Ponder, NW SE Section 15-7-11, derrick abandoned; Service Drilling & Royalty Co.'s No. 1 Whitney Corp., a wildcat in the SE SE Section 32-10-13, dry and abandoned at 2,209 feet.

H. P. Key's location for No. 1 T. J. Paul, a Converse townsite well in Section 10-9-13, is abandoned, and Ben Youngblood abandoned derrick for No. 1 Burkett, NE NW Section 10-9-13. The other Louisiana abandonment was O. Robichaux's No. 1 T. M. Bradford, NE NW Section 16-9-1e, Grant Parish.

New locations were United Gas Public Service Co.'s No. 1 Temple, SW SE Section 21-23-7, Claiborne Parish, about 4 miles northeast of Haynesville; Ed Deckard's No. 2 T. A. Webb, NE SW Section 31-8-11, Zwolle, the first well on the lease having been drilled by A. D. King, trustee, and Graham Producing Co.'s No. 1 Lites, SE SW Section 28-8-11.

R. E. L. Silvey's No. 1 Drake estate, NE NW Section 14-19-10, Webster Parish, was supposed to drill plug at 2,817 feet Wednesday but did not. He claims to have cored sand showing gas from 2,816-24 feet and oil sand from 2,824-29 feet; 6⅝-inch was set without making drill stem test. Location being 6 miles east of old Bellvue production and 14 miles south of Cotton Valley, makes it a rather more than average interesting wildcat. Meanwhile, Blackman and others have assembled 3,000 acres centering on Section 14-22-10, Sarepta district of Webster Parish, for a 3,000-foot test to be begun by March 1.

ARKANSAS

Despite the disappointing results that have followed completion of two producers in Miller County, failures on the north, west and south, there seems to be still more or less trading going on with 4 of the 29 operations listed active. New locations reported from Texarkana as made during the week are Sam Riggs' No. 1 M. S. Boyce, in Section 12-15-27, and D. L. Irwin's No. 1 J. Ellington, in the SW Section 14-15-27, both several miles west of the two producers. Lion Oil Refining Co., of El Dorado, Ark., is reported to have paid $1,000 cash and $1,000 out of the first oil for 60 acres, divided: W half SE NW Section 8-16-26, E half SW SE Section 23-16-27, and W half SW SE Section 23-16-27. Root Refining Co. also is reported buying, having taken 200 acres divided, NW SW Section 36-17-26, SW SW Section 23-17-26, SE NE and NE SE Section 30-17-26, and W half SW Section 32-17-26, consideration not given.

Johnson & Burnham abandoned No. 1 E. L. Beck, SW NE Section 33-15-26, at 3,036 feet, not having encountered any sand anywhere along the log. Bob Manziel's No. 1 B. F. Smith, NE NE Section 32-15-26, was junked and abandoned at 2,930 feet. In Lafayette County, Sam E. Wilson abandoned derrick for No. 1 C. F. Smith, NW SE Section 24-19-25, which was to have been a 3,500-foot test, and has derrick pattern on location for No. 1 Red River Lumber Co., SW SW Section 19-19-25, instead. This is scheduled for a 4,560-foot test on a block of 4,000 acres centering on Section 19, near the town of Bradley.

Jenkins Brothers' No. 1 B. F. Smith, SE SE Section 32-15-26, Miller County, is arranging to go deeper after getting salt water on a drill stem test at 3,010 feet. A boiler explosion on Stephens, Byers & Sartan's No. 1 Jones, NE NW Section 14-16-27, injured two of the crew, not fatally, however, and the rig is shut down until they can get a new one. Both of Miller County's producers have stopped flowing and are rigging up to pump, which accounts for the abrupt drop in daily average runs from the field noted in last week's report.

Pipe Line Runs

A drop of 1,155 bbls. in daily average runs from Zwolle plus smaller declines in Caddo light and heavy oil totaling 390 bbls., offset to some extent by small gains in other pools in the territory produced a net decline of 1,460 bbls. in daily average runs from the fields this week. Runs from the several fields were:

LOUISIANA	Bbls.
Caddo, light	4,765
Caddo, heavy	1,765
Cotton Valley	640
DeSoto-Red River	1,650
Elm Grove	310
Haynesville	3,900
Holly	225
Homer	2,730
Pleasant Hill	225
Sarepta-Carterville	760
Uranin	3,300
Zwolle	8,520
Total	28,760
Last week	30,415
Decrease	1,655

ARKANSAS	
Champagnolle	1,520
El Dorado	2,640
Lisbon	460
Miller County	50
Nevada County	975
Smackover, light	2,640
Smackover, heavy	22,600
Stephens	150
Urbana	610
Total	31,645
Last week	31,450
Increase	195
Both states	60,405
Last week	61,865
Decrease	1,460

EAST TEXAS GAS AREA

The border county gas fields of East Texas are apt to experience a greatly increased output, similar to that experienced by Zwolle, as a result of experiments with acid treatment on two of the old producers in that area. Natural Gas Producing Co. tried it on its No. 7 Roquemore in the B. C. Jordan Survey of Panola County and No. 1 Bryan in the Waskom Field of Harrison County, both producing from the 2,300-foot horizon, in lime. The first, making 400,000 feet per day at the time, responded with 2,000,000 feet and the second had similar reaction. As a result, the company is planning to shoot 20 or more wells, its experience having shown that the acid not only increases the porosity of the producing formation but also cleans the wells of an accumulation of paraffin.

Shelby County contributed a bit of excitement when Oil News Publishing Co.'s No. 1 Pickering, in the G. H. Patterson Survey, near Shelbyville, suddenly started flowing through several hundred feet of open hole full of mud at the rate of 75 bbls. of 47 gravity oil. The hole was abandoned last October at a total depth of 3,320 feet in hard lime after drilling deeper from 1,543 feet where it had pumped 125 bbls. of fluid, 95 per cent water, on first completion in May, 1932. Arrangements are under way to go back, clean out the hole and set a string of 5¾-inch casing, probably at this higher level and install a separator.

Roy Anderson ran drill stem test on No. 1 Breckenridge, Nancy Dycas Survey, of Bowie County, a few miles west of Texarkana, and got 10 thribbles of

(Continued on Page 82)

Wildcat Operations in Louisiana-Arkansas

(Rotary operations unless otherwise designated)

North Louisiana

AVOYELLES PARISH

Company, well, farm name, section and block—	Remarks:
T. J. Woodley, tr.'s No. 1 Thompson & Kolts, 2,640 ft. E, 200 ft. S, NW cor. Sec. 11-2n-5e	S.D. 2,250 ft.

BEAUREGARD PARISH

Beaver Pet. Co.'s (S. T. Ongett, tr.) No. 1 Long-Bell Lbr. Co., 165 ft. S, 725 ft. S, NW cor. NW NW Sec. 34-2s-8w	Set 10-in. 40 ft.
Trapp & Turnbow's (was Trapp Oil Synd.) No. 1 Long-Bell Lbr. Co., Sec. 26-2s-10	Rigging up.
Trapp & Turnbow's No. 1 S. T. Roberts, 150 ft. S and E, NW cor. NW NE Sec. 6-3-10	Location.

BIENVILLE PARISH

Granver Oil Co.'s No. 1 T. J. Lawhon, 150 ft. N and W, SE cor. NE SE Sec. 15-16-3	Derrick.
M. H. Marr et al's No. 1 Caldwell, 450 ft. E, 150 ft. N, center Sec. 23-16-5	Coring 3,090 ft.
R. S. Ross et al's No. 1 W. M. Beck, NE NE Sec. 3-1s-3	Rig up.
Texana Oil Co.'s No. 1 Lawson, 180 ft. W, 600 ft. S NE cor. NW NE Sec. 28-16-9	S.D. 1,625 ft.

BOSSIER PARISH

Breazelle & Steckoll's No. 1 Nattin, C SW NE, Sec. 15-22-14	S.D. 3,018 ft.
Breazelle & Steckoll's No. 1 Nattin, 300 ft. S and W. NE cor. NW NE Sec. 22-22-14	Moving in rig.
Cryer Oil Co.'s No. 1 fee, 2,400 ft. N, 1,980 ft. E, SW cor. Sec. 25-19-12	S.D. 1,900 ft.
Gibson Oil Co.'s No. 1 G. C. Lyon, C SE NW Sec. 34-20-14	Derrick pattern.
A. W. Phillips, tr.'s No. 1 Oden, 300 ft. W, 150 ft. N, SE cor. NW NW, Sec. 4-18-13	S.D. 1,017 ft.

(Continued on Page 86)

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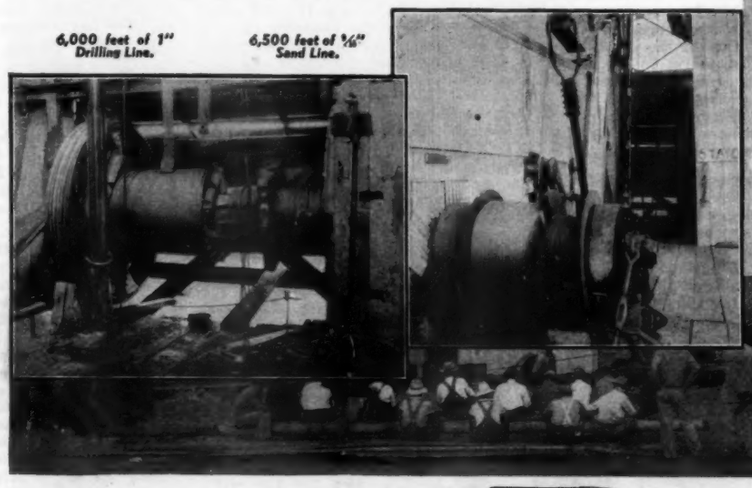

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Licking County Completion Making 75 Barrels Is Best Out of Six in Central Ohio Fields

By GEORGE A. WHITNEY
Staff Correspondent, Central West Fields

FINDLAY, Ohio, Feb. 20.—In the old Lima Field of northwestern Ohio only two completions were brought in, and they were in Seneca County. W. L. Gettman and others' No. 2 on the Francis L. Crum farm, Section 12, Hopewell Township, produced but 3 bbls. initial, while Miller and others' No. 1 on the L. D. Creeger farm, Section 10, same township, was a gas well at a total depth of 1,481 feet. The Sandusky Gas Co. is drilling No. 1 on the Clement B. Conrad farm, Section 3, same township, and Green and others are still shut down at 1,537 feet on the Mary McElhaney farm, Section 15, same township.

The Lewis-Ennis Oil & Gas Co. is drilling on the E. H. Brown farm, in Sections 20 and 30, Grand Prairie Township, Marion County, a real wildcat.

Wyandot County has three wells shut down. They are Newcomer and others' test on the Albert Reber farm, Section 1, Pitt Township; R. W. Kirk and others' No. 2 on the Elmer E. Moser farm, Section 12, Ridge Township, and Harpster and others' No. 1 on the L. G. Beis farm, Section 11, Crawford Township. McPherson and others have a rig on the Carl Smith farm, Section 35, Crane Township.

CENTRAL OHIO

The best oil completion out of six in the Central Ohio Field was Emerald Petroleum Co.'s No. 1 on the Calvin F. Mossholder farm, in Section 14, Fallsburg Township, Licking County, with an initial of 75 bbls. from 3,033-88 feet. The Wehrle Gas Co. is drilling No. 2 on the James M. Iches farm, Section 32, Hopewell Township, same county. G. F. Early and others have a rig on the Davis P. Hall farm, Lot 3, Newton Township, same county.

In Stark County, Jackson Township, the Ohio Fuel Gas Co.'s No. 1-5,653 on the Gertrude Marchand farm, Section 11, and its No. 2-5,695 on the Jacob D. Yost farm, Section 22, same township, are both gas wells. Barnhart and others are drilling No. 1 J. Montgomery farm, Section 25, same township. Brendal Producing Co. has a rig in for No. 10 on the Lake Cable Land Co.'s property, in Section 22, same township. East Ohio Gas Co. made a location for No. 4 on the Edward A. Frank farm, Section 14, same township, and is drilling No. 1 on the Stella Strausser farm, Section 18, Plain Township, same county. Brendel Producing Co. is starting No. 1 on the W. H. Deuble farm, Section 17, same township.

In Belmont County, Union Township, Bradfield and others brought in a good gas well in the Maxon sand at 960 feet, No. 4 on the John Shutway farm, Section 35. O. K. Oil & Gas Co. is drilling No. 3 on the E. B. Brown farm, same section. In Warren Township, same county, Robert Lewis and others found a gas well in No. 2 on the Josephine Turner and others farm, Section 22, at a depth of 1,706 feet.

Faulkner & Phelps are drilling No. 5 on the Sarah A. Donaldson farm, Section 26, Chester Township, Wayne County. In Summitt County the East Ohio Gas Co. made a location for No. 2 on the Everett Baxter farm, Section 17, Green Township. In Fairfield County, Pleasants Township, the City Natural Gas Works is drilling No. 3 on the F. G. Ruff farm, Section 27. Hulse-Kuntz, Inc., is drilling No. 1 on the Charles M. Dawson farm, Section 17, Perry Township, Coshocton County. H. E. Perkins and others have a rig on the H. E. Perkins farm, Section 32, Monroe Township, Knox County.

INDIANA

Compiled by Paul F. Simpson, State Gas Supervisor, Department of Conservation, Division of Geology.

Daviess County—Indiana Southwestern Gas Corp. drilled to 704 feet on the Henrietta Goslin lease, SW Section 9, Harrison Township. The well was plugged back to 745 feet where it is making 250,000 feet of gas. J. C. Howes and others completed their well on the Ross Brothers farm in Section 32, Veale Township, making small production after shot.

Gibson County—Knox Engineering Corp. is nearing completion of No. 1 G. C. and P. G. Sampley, SW Section 23, Columbia Township. Later this well was completed for 9,000,000 feet from 1,432-35 feet.

Hancock County—Vernon Natural Gas & Oil Co. completed a small gas well on the John W. Hudson lot in Fortville. J. H. Snider is still on the Mrs. Sarah Ross farm, in Section 20, Brandywine Township.

Jasper County—J. L. Rosen is drilling a shallow test on the Neal Williams farm in Section 26, Gillam Township.

Martin County — Sproull and others have started a second well on the John Larkin lease, SW Section 19, Perry Township.

Monroe County—Ohio Oil Co. and Petroleum Exploration Co. are starting No. 1 W. J. Neal, SW Section 9, Benton Township.

Perry County—Hughes and others are drilling on the Claude Hall lease, NE Section 2, Anderson Township. George W. Porter plugged No. 1 Charles Reed, SE Section 23, Troy Township, and has moved the rig to the Kraus farm, SW Section 26, Anderson Township.

Pike County—No. 1 Thomas Inman, drilled by Dr. C. C. Taliaferro, NE Section 26, Washington Township, is around 1,100 feet. No. 1 E. E. Reed, drilled by H. A. Moore and others, NW Section 1, Washington Township, is down 1,060

(Continued on Next Page)

But Three Completions in the Eastern Fields; Progress Reported in Virginia Wildcats

By STAFF CORRESPONDENT

PITTSBURGH, Pa., Feb. 20.—But three wells were completed in the Eastern Field and none of these was large, two being gas wells and one a producer with a showing of gas.

Runs of Pennsylvania Grade crude to stills in the Eastern areas continue fair in spite of the low prices prevailing for refined products which have again reached very low levels. Eastern operators are watching the solution of the difficulties in the West with concern. In the Eastern fields a very true balance between production and consumption has been struck and it is being adhered to, with consumption showing a shade better than production at the present moment.

SOUTHEAST OHIO

The only completion in Southeast Ohio during the past week was in Fairfield County in the NE Section 26, Rush Creek Township. There the Blum Oil & Gas Co. completed No. 3 on the J. J. McCandlish farm in the Clinton sand at a depth of 2,647 feet. It will make about a 4 or 5-bbl. pumper and has a showing of about 33,000 feet of gas a day.

Drilling in Ohio

In Columbiana County, two wells are drilling. In Hanover Township, George E. Jewell and others are drilling on the Lebert Louden farm which has reached 3,400 feet. In West Township, the Alcoma Oil & Gas Co. is down 450 feet on the Levi Simmond farm.

In Muskingum County, the Wittmer Oil & Gas Properties' test on the Sarah Miller farm in Section 11, Washington Township, is about due in the sand. In Perry County, the Hopewell Fuel Gas Co. is making fair progress on the C. M. Forsker farm, Section 5, Bearfield Township.

In Coshocton County the second test of the Murphy Petroleum Co. and others on the Ward A. Little farm in Section 17, Perry Township, is reaching the sand. In the same township two other wells are drilling. The Preston Oil Co. has No. 3 drilling on the F. H. Donaker farm, same section, which is about due in the sand. Kundts-Hulse, Inc., and others are drilling on the C. M. Dawson farm.

In Holmes County, the Mehowa Oil & Gas Co. is reaching the deeper levels in Section 25, of Hardy Township, on the B. J. Ulrich farm. In Licking County work is slow. In the shallow sand district of this county, G. F. Early and others are drilling on the David P. Hall farm, Lot 3, Newton Township.

In scattered sections little new work is visible. In Knox County H. E. Perkins and the Upham Gas Co. should finish a test drilling on the Ross Hunter farm in Section 21 of Union Township. In Monroe County the Southerland Oil & Gas Co. is drilling in Franklin Township, on the W. A. Quigley farm in Section 9. In Belmont County work in the new pools, Union and Richland Townships, has been postponed.

WEST VIRGINIA

The sharp and continued weather in the East was a boon to operators in the gas fields. Under fortuitous arrangements much of the potential output under contract has been shut in, being surplus in view of the low industrial demand and mild weather. Shipments of gas to the Eastern markets has increased slightly with the increase in demand. The curve in that direction is definitely rising but not sufficiently fast to absorb the surplus supply.

During the past week but two wells were completed in West Virginia and both were gas wells. No new production was reported. The larger was in Boone County, where the Cambridge Gas Co. completed No. 4 on the C. C. Lewis heirs' farm in Scott district. It was drilled in the Beren sand at a depth of 2,600 feet and after shot is showing for slightly better than 250,000 feet a day.

In the active pool in Guyandotte district, Cabell County, the Cisco Drilling Co. completed a test on the Ed Bull farm in the brown shale at a depth of 3,054 feet and after shot it is showing for a small gas well.

Drilling in West Virginia

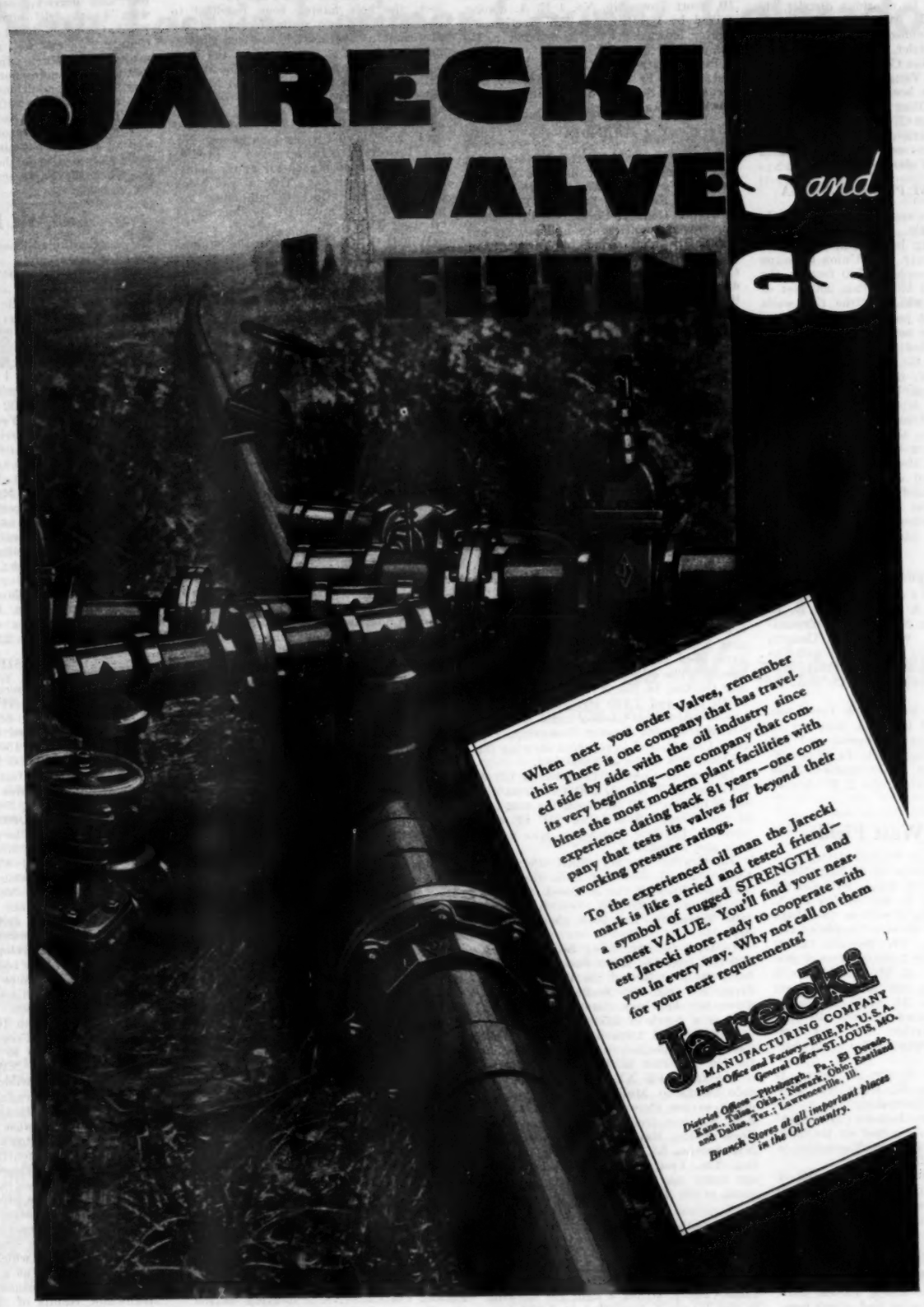
In Wetzel County, the Shimwell Oil & Gas Co. is lowering the depth of its test on the W. J. Price farm which struck oil at 3,083 feet. At 3,086 feet the fluid stood about 800 feet in the hole. About 75 bbls. has been swabbed during drilling and the depth is now 3,120 feet. In other parts of the county little is being done. The test of the State Line Oil & Gas Co. on the C. W. Kirkhart farm in Church district, is shut down at 3,250 feet waiting on a test.

In Marion County, the Hope Natural Gas Co. is rigging up a new outfit, after the fire, to run 3-inch tubing in its No. 6,794, on the Nancy L. Murray farm in Mannington district. This well was drilled deeper and showed a test of 3,500,000 feet a day before igniting. In the same district, J. J. Allen and others have completed a road to their location on the James A. Haught farm.

In Calhoun County, two new locations have been made, both by F. F. McIntosh and in Lee district. One is on the F. L. Haymaker farm, and the other on the Charles and John Davis farm. In Sherman district, H. B. Scott has started drilling on the Board of Education property. In the same district, C. A. Jarvis and others are building a rig on the Ida M. Whipkey farm. Creed Barker and others are down 1,760 feet in a second test on the H. Johnson farm, same district. In Sheridan district, Ira Haught and others are nearing the sand in a second test on the Alva Elder farm, the depth being now 1,800 feet. W. T. and O. L. Yoke have reached 750 feet on the A. T. Yoke farm. In Washington district, Norris and Cain are rigging up on the John T. Miller farm.

In Geary district, Roane County, two wells are drilling. The Tawney Oil & Gas Co. is down 1,500 feet on the D. L. Tawney farm. The Big Sandy Oil & Gas Co. is drilling at 1,130 feet on the T. F. Smith farm, a second test.

In Cabell County, the Northpole Ice Co. is down for a shot in its test on its own property in Guyandotte district. The depth is 2,739 feet. Swanson and Hatchard have reached 2,600 feet on the F. M. McCoach & Co. property. The Midway City Gas Co. has passed a similar level on the C. L. Ritter lot. C. C. Wolfe and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others are rigging up for No. 5 on the Ben Lomond Land Co. tract.

In Lincoln County, the Cambridge Gas Co. is approaching a sand in its second test on the Charles Harless farm in Duval district. In Jefferson district Pridemore and Adkins are drilling on the Lonnie C. Egnor farm and have passed the 1,100-foot level. In Sheridan district, the B. C. K. Gas Co. has reached 2,000 feet on the M. H. Johnson farm.

In Union district, Logan County, the Burgess Oil & Gas Co. is down 2,100 feet on the Robert Vaughn farm. No additional depth has been made in the three other wells drilling in this county in Union, Logan and Chapmansville districts. In Sherman district, Boone County, the Pure Oil Co. has reached 2,384 feet in No. 59 on the Federal Coal Co. tract.

SOUTHWEST PENNSYLVANIA

No completions were recorded in Southwest Pennsylvania. Interest is centered in a test drilling in Amwell Township, Washington County. The Union Gasoline & Oil Co. has reached 2,700 feet on the Paul Lewis farm and within 250 feet of the Fifth sand which in the five wells completed in that pool is found at about 2,955 feet. In the same district, the Carnegie Natural Gas Co. has reached 1,800 feet on the C. L. Morton farm. In the same locality, the Wise Oil & Gas Co. is rigging up on the John Roach farm. Lawrence & Co. are down 1,025 feet on the McDonald heirs' farm. In Amwell Township, the Carnegie Natural Gas Co. has a rig standing for another test on the Mrs. Menzor farm.

In the Dunkard sand pool, in Washington County, Baldwin and Gaskell are fishing at 800 feet on the R. G. Clark farm, within 100 feet of the sand. Work in the remaining parts of the district is very quiet.

Wildcats

Drilling has been resumed in the deep test of Benedum & Trees on the E. E. Knowlton farm in Section 10, Independence Township, Washington County, Ohio. A new cable was rigged and the depth is now approaching 7,100 feet, with the Clinton sand expected in the next 50 or 100 feet.

In Virginia, the Benedum & Trees' test on the Clinchfield Coal Co. property in Russell County, made progress and has passed the 5,000-foot mark. In Washington County, Brehn & Co. reached 2,730 feet in their wildcat on the J. M. Arnold farm.

Central West Fields

(Continued from Preceding Page)

feet. Claude E. Noble is drilling No. 1 on the Helen Smith lease, SW Section 17, same township. In SE Section 19, A. E. Davis is starting a well on the Hugh Smith land. A. V. Burden completed No. 2 William Smith, SW Section 17, at 1,025-35 feet, getting 2,100,000 feet of gas.

Spencer County—E. M. Treat & Co. is starting a well in the Raymond Bretz lease, NE Section 34, Ohio Township. The Cunningham sand produced 10 bbls. initially in the Arthur Ray well completed by the Packard Oil Co. in Section 11.

Stark County—Henry A. Joern is drilling the Wanda M. Joern test, NW Section 36, Davis Township.

Sullivan County—Jackson Hill Coal Co. completed the deep test on its land, SW Section 10, Jackson Township, a dry hole at 2,268 feet.

Tippecanoe County—The test well of the Methodist Episcopal Church land, in Section 27, Tippecanoe Township, has drilled into the Trenton without a commercial showing.

Vanderburg County—John Drake and others are drilling Nos. 3 and 4 on the John and Mary Effinger lease, NW Section 33, Center Township. In SE Section 29, John R. Knapp and others completed No. 1 Oscar Euler, dry at 953 feet. Ellis and Young are drilling on the corner of the Evansville Airport land, SW Section 33. In the same quarter section, Maxwell Petroleum Corp. is nearing the completion of No. 3 George Hornby. A well drilled by J. S. Young on the narrow strip of land belonging to the Iglehart Milling Co. was a 15-bbl. well. Maxwell Petroleum Corp. got a dry hole on the Helen L. Luhring farm, NW Section 28, and has moved the rig to the Young farm in the same quarter section for another test. C. J. Weidemann is drilling No. 1 W. W. Sipp, SE Section 19, Scott Township. No. 1 E. A. Swope, drilled by C. M. Root, SW Section 29, Center Township, was completed a 10-bbl. well.

Vigo County—The Cyrus L. Lane deep test, drilled by Dr. C. C. Taliaferro, NE corner of Section 22, Prairie Creek Township, was plugged.

ILLINOIS

The only change in the Illinois fields was the abandonment of Ohio Oil Co. and other's No. 1 on the Hugh Garvey farm, SW Section 4, Dennison Township, Lawrence County. Several drilling wells over seven counties are under way, but practically shut down on account of weather. The only well completed during the past few weeks was a light gas well drilled by W. C. McBride, Inc., NW Section 2, Montgomery Township, Crawford County, on the S. H. Rinkett farm, at a depth of 890 feet.

KENTUCKY

Practically all drilling wells over the Kentucky area, are reported shut down, especially in the western part of the State. The only late well to be completed was Vickers and others' No. 1 in the southwest corner of the Archie Dickens farm, 4 miles southeast of Whitesville, in Ohio County, and it was a dry hole.

California Fields

(Continued from Page 75)

feet, the hole having been redrilled to bottom. These two wells, located in the Huntington Beach Field, reflect the renewed interest of operators in the Seventeenth Street town lot area. The Barnsdall Oil Co. has decided to finish No. 5-A Rosecrans in the Zins zone in the Rosecrans Field, instead of carrying it down as a deep test in the Gordon zone picked up in No. 2 Trust a few months ago. No. 5-A Rosecrans is being given a production test and looks good for approximately 250 bbls. per day. Tubing was being lowered in an effort to cut down gas production and stimulate production of oil from 5,917 feet.

Willett Oil Co.'s wildcat in the Saugus-Castaic district of Los Angeles Basin was still blowing out late this week, several days after it got beyond control, but the blow of gas has shown a consistent decline. This well blew in doing approximately 12,000,000 feet of dry gas per day from around the 1,900-foot level. The gas has not become ignited due to the fact that the well is also producing about 4,000 bbls. of water and a trace of oil. A core was taken early in the week when the well suddenly showed a loss of circulation. Pipe was pulled up and the well blew in after two joints had been disconnected. The gas and water are coming up around the drill pipe through the 9⅝-inch hole. The accumulation of any considerable amount of gas in this general area is unusual and may be of some significance. The equipment consists of an 80-foot stub derrick, using a small rotary with 4-inch drill pipe. The Buttes Oil Fields Co. has finished its No. 1 in Sutter County as a gas well at 2,731 feet. This project, near Marysville in Section 5-16-1 and about 50 miles north of Sacramento, may lead to additional development if the well shows a sufficient amount of gas. The production test had not yet been concluded at last reports and its potentiality is undetermined. Several gas wells were drilled in the Sacramento Valley along the Sacramento River a number of years ago.

La.-Ark. Fields

(Continued from Page 78)

water in 20 minutes, shut down and is waiting orders at 3,045-52 feet. Prairie Creek Oil & Gas Co. set 4½-inch at 3,335 feet on No. 1 Ellington, J. Burleson Survey, Shelby County, to test a show of oil and gas in 2 feet of sand at 3,397-99 feet, total depth 3,422 feet.

Completions in East Texas were: Flanagan & Foster's No. 1 Davidson, T. P. Bullock Survey, Harrison County, dry and abandoned at 3,852 feet; A. E. Roscoe and others' No. 1 Vever Towell, Lewis Watkins Survey, Harrison County, dry and abandoned in sandy lime at 3,788 feet; George Hindman and others' (Branson & Hammond) No. 1 F. O. Lindsey, Alex Albright Survey, Marion County, old well dropped from report, total depth 1,260 feet; Ridgeway and others' No. 1 Polley, Domingo Gonzales Survey, Shelby County, dry and abandoned at 2,850 feet, corrected depth; Sedberry and others' No. 1 Pickering, Jane Stoddard Survey, dry and abandoned at 2,375 feet; Wray & Dunbar's No. 1 C. A. Hayden, D. T. F. Yordt Survey, old well dropped from list, total depth 2,280 feet.

MISSISSIPPI

Jackson gas field's second oil producer, J. A. Matson and others' No. 1 Warner, NW SE Section 4-5n-1e, Rankin County, is formally disposed of with the rating of an estimated 150 bbls. of heavy asphaltic oil with 1,000 bbls. of salt water, total depth 2,486 feet. It is practically a duplicate of Henslee and others' producer, completed last September on the same 40 acres, at 2,469 feet and, like the Henslee well, will be put on gas pressure. When this was done with the latter well it increased the flow of salt water without increasing oil production. Love and Lancaster's No. 1 Elton Plantation, SE SE Section 17-4-1e, Hinds County, was junked and abandoned at 5,050 feet. In Sunflower County, Mississippi Oil & Gas Development Co. abandoned the first of five tests it is to make on as many 25,000-acre block in Sunflower, Leflore and adjacent counties, all to go 4,000-4,500 feet. It was No. 1 School Land in Section 16-20-4, and was junked at 3,702 feet. Ferguson-Fuller and others are rigging up to drill No. 1 W. B. Montgomery, NW NW Section 26-6-1e, a Hinds County wildcat.

A more or less alarming situation has developed in the Jackson gas field, alarming chiefly because the wells involved are Jackson townsite producers. It was discovered recently that more or less pressure has developed between casings and in one or two cases that gas is seeping up outside the pipe. Operators in the field held a meeting recently and after considerable discussion of the problem decided to odorize suspected wells to definitely determine which of the producers is responsible as a starting point for taking remedial measures.

Meanwhile, results of the Gulf Refining Co.'s second core test on its big block in South Mississippi, the nature of which is not definitely known outside company offices, has prompted an influx of several of the major companies, several of whom have not appeared in this division before, buying protection wherever they can get it.

Test South of the East Pool, Michigan, Being Closely Watched by Operators

By GEORGE A. WHITNEY

MOUNT PLEASANT, Mich., Feb. 20. One producing oil well and three dry holes were reported in the Central Michigan Field. Many of the drilling wells have been shut down on account of weather. The oil well was drilled by Wittmer Oil Co., in No. 2, 450 feet from the north line and 1,120 feet from the east line of the Sarah Cashen farm, NW NE SW Section 30, Denver Township, Isabella County, and is reported showing for 25 bbls. at a depth of 3,665 feet.

In Oceana County the Johnson Oil & Refining Co.'s No. 1, 990 feet from the south line and 330 feet from the east line of the James Gilpin farm, SW SE Section 15, Leavitte Township, was a dry hole and abandoned.

In Gratiot County Shell Petroleum Corp.'s No. 1, 660 feet from the south and east lines of the J. Covell farm, in the center of SE NW Section 15, Saville Township, has been abandoned as dry.

In Cass County, Scott Stumler's test, 400 feet from the south line and 300 feet from the west line of the W. N. Wright farm, SW SE SE Section 8, Volumia Township, has been abandoned as a dry hole at a depth of 2,530 feet.

With several tests in the East Field due for completion, interest centers on the No. 2-B Yost in the southeast corner of the farm, SE NE Section 34, Greendale Township, Midland County, and an offset to the Pure Oil Co.'s No. 1. No. 2-A, 330 feet from the south and west lines of the Mattie Yost farm, S half NW Section 35, same township, is drilling. The Yost area, where these wells are under way, is approximately 3 miles south of the East Pool.

Field Pickups

Strange Oil & Gas Co.'s test, 300 feet from the south line and 990 feet from the west line of the J. L. Littlefield farm, SE SW SE Section 9, Surry Township, Clare County, struck a light gas showing in the Marshall formation at 1,600 feet, but there was little promise of paying gas production and preparations are being made for a deep test in that locality.

Michigan Pacific Oil & Gas Co.'s No. 2, 990 feet from the north line and 330 feet from the east line of the James H. Otway, Jr., farm, NE SW Section 22, Porter Township, Midland County, reported a showing of oil at 5 feet in the Dundee formation, and should be completed within a few days. No. 1 on this farm proved only a light producer when drilled in but when treated with acid showed for 200 bbls. The Pure Oil Co. offset No. 1 Otway and abandoned it as a failure.

Talbot Oil Co.'s No. 4-B, 330 feet from the south line and 990 feet from the east line of the State of Michigan land, SW SE SE Section 11, Greendale Township, Midland County, is nearing completion. Pure Oil Co.'s No. 2, 2,310 feet from the north line and 330 feet from the east line of the S. O. Vinton farm, E half NW Section 18, Greendale Township, is in the Dundee formation.

Four drilling permits were issued: To Lawson Oil & Gas Corp. of Detroit, for No. 1, 330 feet from the south and west lines of the Arlinda and Arville Thayer farm, SW SW NW Section 23, Vernon Township, Isabella County; to the Mellon-Pollock Oil Co. of Pittsburgh, Pa., for No. 1, 990 feet from the north line and 330 feet from the east line of the Mrs. David Crowley farm, SE NE NE Section 23, Vernon Township, Isabella County; to James A. McKay for a test 870 feet from the south line and 400 feet from the east line of the M. Gallagher and S. M. Callahan farm, NE SE SW Section 6, Clare Township, Clare County, and to the Pure Oil Co. for No. 5-A well, 1,650 feet from the north line and 330 feet from the west line of the Iosco Land Co., W half NW Section 16, Greendale Township, Midland County.

The Vernon Field, Isabella County, is attracting considerable attention since the Brief farm well was treated with acid and showed a flow of 700 bbls., after producing naturally for a long period. No. 2 on the Russell farm and No. 2 on the Haring farm, are to be new locations, both being offsets to production. Mellon-Pollock Oil Co.'s No. 1 location on the Crowley farm, SE NE NE Section 23, Vernon Township, will be watched with great interest by operators as it is farther east than any other locations and may determine the limits in that direction. Most of the wells in this field are flowing but a few are being pumped and salt water is a great handicap.

Activities in Lea and Eddy Counties to Increase; New Test in Larimer County, Colorado

By TOLBERT R. INGRAM
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., Feb. 20.—Blizzards in the Rocky Mountain area, with the temperature ranging from 35 degrees below zero at Artesia, N. Mex., to 45 degrees below in some parts of Montana, caused most of the drilling wells to shut down. No completions or new locations were reported in New Mexico. Increased activity in Lea and Eddy Counties is expected in the spring. In Colorado, one new operation was reported in Larimer County in a well that will test the Pennsylvanian.

One completion was reported in Wyoming in the Continental Oil Co.'s No. 1 Northern Pacific, on the Frannie Dome, in Park County, which pumped 346 bbls. first 24 hours. A freak wind did a little damage in the Pilot Butte Field with the thermometer registering 40 below zero. One well in Albany County spudded. Wyoming is expected to join with Colorado in legislation affecting crude oil prices.

Montana reported one completion, estimated at 40 bbls., in the Cut Bank Field. One South Dakota test is preparing to resume and Oregon showed a little increase in activity.

NEW MEXICO

Lea County

A blizzard, the like of which is not very often experienced in that district, swept down upon southeastern New Mexico the past week and for a while practically all drilling operations were at a standstill. The official government thermometer at Artesia registered 35 degrees below zero Tuesday night. Carlsbad reported 17 degrees below and Roswell 24 below. E. C. Norwood, drilling contractor, and Will Wilson, an oil field worker, suffered from exposure in the Hobbs Pool, their hands and feet becoming frozen while working on a water supply pipe making emergency repairs. An unidentified oil field worker was stranded on the highway near Hobbs when the radiator of his car froze and he walked half a mile to the Skelly camp which he reached almost exhausted with hands, feet and ears frozen. Telephone and telegraph wires were down for a while, but service has been restored.

No completions or new locations were reported. In the Hobbs Pool Tidal Oil Co.'s No. 4 Hardin, SW NE NE Section 19-18-38, is bottomed at 4,043 feet and completion is delayed by a fishing job. Humble Oil & Refining Co.'s No. 1 Hardin, SW cor. NW Section 18-18-38, set 15½-inch at 222 feet with 225 sacks and is waiting, and Skelly Oil Co.'s No. 1 State, SW SW Section 17-18-38, cemented 12½-inch at 214 feet with 75 sacks. Amerada Petroleum Corp.'s No. 3 Hardin, NW cor. SW Section 18-18-38, is rigging up rotary.

In the Eunice area, Atlantic Oil Producing Co.'s No. 1-B State, C NW SE Section 8-21-36, is rigged and ready to spud.

DeBaca County

Landowners Oil Co.'s No. 1 State, SW cor. NE Section 16-1s-27, Buffalo Creek, is shut down at 5,685 feet in lime for engine repairs.

Eddy County

Reports indicate that eastern Eddy County and western Lea County will be more active the coming spring than for some time. Several important tests are scheduled for drilling. The major companies have been doing considerable geological and geophysical work in that territory during the past two years and quite a little leasing has taken place.

R. Spearow and others' No. 1 McClellan, SW NW NE Section 22-22-23, Indian Creek, is drilling at 1,425 feet in black lime. Leonard-Barnsdall Oil Corp.'s No. 1 Dodd, SW SE SW Section 22-17-29, Jackson area, is drilling at 2,175 feet in lime, and Flynn, Welch & Yates' No. 65 State, NE SE SE Section 30-18-28, is drilling at 1,765 feet in anhydrite and sand.

No reports were received from outlying wildcats and all operations in the northwestern part of the state were idle on account of the weather.

COLORADO

Weld County

Continental Oil Co. and others' No. 1 Anthes, C NE NE Section 24-8n-59, drilled to 3,347 feet (cor.), with cable tools by the Tulsa-Fort Morgan Petroleum Corp., has resumed drilling with rotary under the joint operating agreement and is making hole below 3,400 feet. The 10-inch was cemented at 3,068 feet. Mead Brothers, who have the contract on this well, express the opinion that with ordinary good luck the hole will be down to the Muddy within three weeks.

Washington County

Akron Oil & Development Co.'s No. 1 Gilcrest, SW SE SW Section 22-3n-53, Fremont Butts area, which spudded in a 24-inch hole and shut down, and in which C. C. White of Denver is interested, has a block of 13,000 acres of which 5,000 acres are in the same township and range as the test.

Rio Blanco County

The California Co.'s No. 1 California-Raven, NW SE Section 30-2n-102, Rangely Dome, is drilling at 7,059 feet.

Larimer County

Art Deininger and others' No. 1 Kistler, C Section 2-4n-70, northwest of the Berthoud Field, a new operation, is drilling at 280 feet in lime after setting the 10-inch at 87 feet. It starts in the red beds. The location is 2½ miles north of a test to the Sundance drilled some time ago by Continental Oil Co. in its No. 1 Hoffman, which suspended at 1,510 feet.

Fremont County

Cherry Creek Placer Co.'s No. 1 Lucas, SW cor. NE Section 32-18-69, Florence district, is drilling at 1,100 feet in hard light lime.

WYOMING

Park County

The only completion reported in Wyoming was Continental Oil Co.'s No. 1 Northern Pacific, SE SW NE Section 23-58-98, Frannie Dome. It made 346 bbls. first 24 hours on the pump from the Tensleep at 3,320-46 feet. Total depth is 3,346 feet. It is a little more than half a mile north of the nearest producer, but is on a slightly higher contour and yielded no additional information as to the area of the productive limits of the pool.

Big Horn County

W. O. Taylor and others' No. 1 Hos-

(Continued on Next Page)

Three Tests in Extreme South of Turner Valley To Resume as Soon as Weather Permits

By VICTOR LAURISTON
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, Feb. 18.—Pipe line deliveries for Turner Valley for January aggregated 43,989 bbls., compared with 53,406 bbls. in December, a decline of 9,417 bbls. The major part of the decline was apparently due to the absence of deliveries from Mercury Oils, Ltd., which is understood to be retailing its production direct and which in December had an output of 6,180 bbls. Deliveries to Imperial Oil, Ltd., for January included 15,165 bbls. of crude naphtha, 14,002 bbls. of discolored naphtha and 4,675 bbls. of light crude oil. This compared with 17,118 bbls. of crude naphtha, 21,889 bbls. of discolored naphtha and 7,531 bbls. of light crude in December. Deliveries to Regal Oil & Refining Co. totaled 1,847 bbls. in January, compared with 2,810 bbls. in December, and deliveries to Bell Refining Co. were 8,300 bbls., against 4,400 bbls. in December.

Of the producing companies listed, Royalite Oil Co. was the leading producer with 7,674 bbls. of naphtha and 95 bbls. of light crude. This includes production from three wells of Southern Lowery Oils, Ltd., recently merged with Royalite. Other major producers included Merland Oil Co., 6,407 bbls.; Mayland Oil Co., 3,884 bbls.; Sterling Pacific Oil Co., 3,615 bbls., and Model Oils, 3,927 bbls. The latter is a producer of light crude. Light crude production from Mylo Oils, Ltd., formerly delivered to Imperial Oil, Ltd., is now taken by the Bell Refining Co. The majority of the companies delivering to Imperial Oil, Ltd., showed slight increases over December.

Aggregate deliveries of 43,989 bbls. in January, 1933, compared with 68,893 bbls. in the same month last year.

Mar-Jon Gets Gas Flow

In South Turner Valley, Mar-Jon-Freehold's No. 1, LSD 9, Section 28-18-2w5, encountered an unexpectedly heavy wet gas flow in the top of the Madison limestone at about 5,431 feet. The pressure was strong enough to blow the fluid out of the hole. The gas show was unusually large for the top of the lime, where only small showings are customarily encountered. The test, indicating an important extension, is deepening below 5,470 feet, after changing bit with flush joint pipe and heavier fluid to control the gas. The wet gas is reported to show a very strong naphtha content.

Five different companies are interested in the test which is being handled primarily by Freehold Oil Corp. of Calgary, with Senator Laird of Regina as president and A. J. McWilliam as field supervisor. Mar-Jon Oil Co. receives a 12½ per cent royalty, with the remainder divisible between Freehold Oil Corp. and Mayland Oil Co., subject to a 3 per cent royalty to Calgary & Edmonton Corp. Royalite Oil Co. is interested through its 51 per cent controlling interest in Mayland Oil Co.

Farther north, Associated Royalties' No. 1 Spray, LSD 9, Section 4-19-2w5, is drilling in a hard caprock below 3,325 feet. The test is making slow headway, two tours showing only 81 inches of new hole.

New Tests in South

As soon as weather conditions improve, work will be under way on three new tests in the extreme south end of the Turner Valley Field. Two were spudded late in December. W. Fay Becker Syndicate's No. 2 Anaconda, LSD 15, Section 28-18-2w5, has been standing around 210 feet, a test of the Dalhousie sand, offsetting Merland Oil Co.'s No. 1 which got good shows in that horizon. In the far south, Union Drilling Co.'s No. 1, LSD 8, Section 21-18-2w5, has been shut down at 100 feet. It is a mile south of Mar-Jon Freehold's No. 1, and being outside the restricted area, can be drilled into the deep lime. On the next section east, another new deep lime test has been located by the Lundy interests in LSD 13, Section 22-18-2w5.

This test is being undertaken by a closed syndicate comprising Henry S. Hoffar of Vancouver, president of the Boeing Aircraft Co. of Canada, and Frank D. Lundy of Vancouver. The test is expected to get under way in March, a heavy duty drilling outfit of Anglo Pacific Oils, Ltd., being used. The location is south of Merland Oil Co.'s No. 1 producer and somewhat north of Union Drilling Co.'s No. 1, the latter being the farthest south test in the field.

North Turner Valley

In the North Turner Valley, Model Oils' No. 2, LSD 16, Section 22-20-3w5, is reported drilling near the bottom of the Dakota formation below 4,345 feet.

Red Coulee Field

In the Alberta end of the international Red Coulee Field, Devonshire Oils' No. 1, LSD 3-4, Section 10-1-16w4, is drilling below 2,010 feet. On the Montana end the outfit at Askalta Oils' No. 2 producer was damaged by fire recently.

Tests in the Foothills

On the Moose Dome, Herron Cartage Co.'s Moose Oils No. 1, LSD 16, Section

29-22-6w5, is cleaning out around 2,810 feet.

On the Monarch structure, west of Olds, Cartier-Majestic's No. 1, LSD 3, Section 36-31-7w5, is sidetracking around 1,425 feet. Hunter Valley Oil Co.'s No. 1, Township 31-10-w5, in the forest reserve, is held up by weather.

Border Fields

In the Lethbridge area, Hudson's Bay Oil & Gas Co.'s No. 1 Keho, LSD 2, Section 17-11-22w4, on the Keho Lake structure is continuing its bailing tests of the Benton oil sand at 3,770 feet. On the Twin River structure, movement of fuel oil to Nordon-Roney's No. 2 Twin River, LSD 11, Section 2-2-20w4, has been held up by heavy drifts.

Montana Operations

On the Montana side, Alberta Pacific Consolidated Oils' No. 1 Kiesel, Section 11-34-6w, in the Cut Bank Field, is reported drilling below 2,705 feet and getting close to the producing horizon. Alberta Pacific's No. 1 Matson, S half NW Section 14-34-6w, is at 2,760 feet and trying to pull lost tools. Dakota-Montana Oil Co.'s No. 1 Drumheller, SW half Lot 2, Section 3-34-6w, is reported in the sand at 2,945 feet with a potential production of 80 bbls. a day, and some gas. L. R. Hannah's No. 1 Britton, NW NE NE Section 14-34-6w, looks like a good producer, flowing nearly 100 bbls. in an hour, from a sand at 2,897 feet. Roy Tarrant's No. 1 Britton, NE NE SE Section 14-34-6w, is reported swabbing between 40 and 50 bbls. a day after a shot which apparently damaged the casing. Adams & Mannix's No. 1 Britton, SE SE NE Section 14-34-6w, has run 6-inch casing past lost tools and is setting 4½-inch at 2,842 feet before drilling into production.

Roy Tarrant's No. 1 Haglund, Sr., SW SW NW Section 13-34-6w, is reported standing. If the shot in No. 1 Britton proves successful, it is understood the Darling sand will be shot in this and other Tarrant wells. Other operations include two tests standing, one drilling, one fishing and three rigged.

Extensive drilling is forecast for the coming summer, including 14 wells spotted for the Roy Tarrant interests by J. S. Irwin, formerly of Denver and Calgary, and from 14 to 18 tests for the Santa Rita Oil & Gas Co., locations to be made by Irvine E. Stewart of California.

A new test in the Montana bad lands, offsetting the unfinished Myers & Johnson test, is being spotted in Section 18-34-1w by John Etheridge, representing the Edmonton-Montana Syndicate.

Canadian operators are watching with interest the resumption by P. W. Timmons of the unfinished Faro-Norris No. 1 test in Section 29-37n-15e, standing at 1,070 feet. The location is north of Havre, just south of the international boundary, and almost opposite the Alberta-Saskatchewan provincial boundary.

Athabaska Test

In northern Alberta, Athadome Oils' No. 2, LSD 3, Section 15-66-23w4, is reported drilling below 800 feet, but having trouble with caving. Work is being carried on with a temperature between 40 and 60 degrees below zero.

Fort Norman Prospects

In the far north there may be some activity this summer in the Fort Norman Field on the Mackenzie River. In this field Imperial Oil, Ltd., has two producing wells, drilled between 1919 and 1922, and which have been shut in till last year, when some of the production was refined and sold for use in the new mining field at Great Bear Lake, 300 miles east of Fort Norman. Operations last summer continued for about two months while navigation was open, and were in charge of Ronald W. McKinnon. Production was taken mostly from No. 2. Some 20,000 gallons of gasoline were refined in a small stripping plant, and a considerable quantity of crude was produced for fuel oil purposes.

It is expected that operations will be resumed by Imperial Oil, Ltd., this summer. Work in the Great Bear mining area will undoubtedly be much more extensive, the 1932 development being largely of a preliminary nature; and there should be a much greater demand for petroleum products in 1933 and subsequent years. The two wells, however, are thought to have sufficient production to meet immediate demands, and no new drilling is contemplated by Imperial Oil, Ltd.

Fort Norman Oil Co. is reported arranging to resume drilling operations in another portion of the field. This company about 10 years ago drilled a test, in conjunction with the Mackenzie River Oil Co. Drilling was handled by F. H. Stover of Chatham and was carried to about 1,520 feet, when work was shut down for the season. The problem of transporting crude production from Fort Norman to potential markets was then regarded as insuperable. The company is understood to have kept its leases in good standing, and its outfit is still in the north. Opening of the Great Bear Lake mining area provides a potential market at prices much better than in other parts of Canada, with the result that some further drilling may be undertaken this season. The company, which has its office at Toronto, is reported to have secured additional backing from New York interests.

Saskatchewan Oil Prospect

In northern Saskatchewan, Petroleum Engineering Co. of Winnipeg is reported arranging for systemmatic development this year of a potential shallow oil field at Hudson Bay Junction. The field was indicated in a structure test drilled last season. Attention was first directed to the area as a result of oil seepages discovered by John Wells, a resident of Hudson Bay Junction, and geological work was undertaken by the Petroleum Engineering Co. Work was made difficult by the heavy overburden of drift, muskeg and dense forest, and to secure substratum information a structure test was started close to one of the big oil seepages. Simultaneously, a force of men was engaged digging trenches and open cuts. This work uncovered the southwest flank of the structure on the banks of the Red Deer River, the strike of the structure running northwest and southeast, with the well about 4 miles northwest of the exposure. The structure here had a dip of 30 degrees to the southwest, and a core taken from the well showed a similar dip. Further field work located the northeast side of the structure with a dip of 28 degrees to the northwest. A big fault crosses the structure and apparently closes it to the east while another large fault follows the strike of the structure about a half mile west of the east flank.

While previous geological reports on the general area indicated a sequence of Foxhills, Pierre, Niobrara and Benton, the exposures showed the Benton formation with the overlying formations completely eroded. This was confirmed by the structure test drilled, which at 300 feet passed from the Benton into the Dakota. As the location was pretty far down on the flank of the structure, a water well was looked for. Instead an oil sand was encountered. Drilling was continued 51 feet into the sand when the tools jammed, cable broke and in attempting to recover the tools the casing parted. This was late in December, so operations were discontinued until spring. Instead of attempting to sidetrack tools and casing, a new test will probably be started on the top of the structure, where the Dakota may be reached by about 200 feet of drilling.

Operations in Ontario

In Kent County, Glenwood Syndicate's No. 1, S half Lot 10, Concession 13, Tilbury East Township, is reported rigging up for a test of the Tilbury sand. Farther east, in the Clearville area, Vacuum Gas & Oil Co.'s No. 5, Lot 53, South Talbot Road, Orford Township, is reported spudding in. Equipment was moved from No. 4 well, 3,500 feet farther north.

Shareholders of the Petrol Oil & Gas Co. at a meeting in Toronto re-elected the following directors: R. S. Williams, H. F. Gooderham, A. J. Anderson, G. G. Mitchell, Sigmund Samuel, A. E. Beck, H. C. Hatch, and W. H. Mara.

Rocky Mountain

(Continued from Preceding Page)

kins, Lot 5, Section 25-56-97, Byron area, shut down on account of the weather after cementing 15½-inch at 52 feet.

Washakie County

The Bales Oil Trust, which recently completed a small oil well on the Hidden Dome, has let a contract to D. L. McDonald, of Billings, Mont., to drill five wells on that structure. The contractor furnishes all materials and completes the wells and will receive his pay out of half of the production in the one producer and all the production from any additional producers until he is reimbursed. First well will begin spudding by May 1.

Fremont County

The Texas Company's No. 2 State-Ridgway, SE SW SW Section 36-34-95, Alkali Butte, is preparing to resume coring at 4,782 feet at which depth it was 3 feet in a sand below the Morrison.

The rotary derrick on Kinney-Coastal Oil Co.'s No. 1 Dykeman, SE SW Section 22-3n-1w, Pilot Butte, which was completed as a big gas well three years ago and shut in, was blown down the past week by a freak storm. The derrick is in a cottonwood grove and it is believed a guy wire gave way under the strain. The temperature was 40 degrees below zero at the time and a wind-storm with the temperature so low is unusual.

Carbon County

Ohio Oil Co.'s No. 1 Kanawha, SW NW NE Section 34-23-79, Allen Lake, is on top of the Dakota at 1,427 feet and is showing considerable gas. It is underreaming to lower pipe to the top of the sand. The Muddy showed some gas in 5 feet of sand, but was not commercial. This well is being drilled to furnish a reserve of natural gas for the Rocky Mountain Gas Co., which recently took over the Laramie Gas Co., the distributing company in Laramie. Natural gas from Dutton Creek was turned into the line on February 15.

Albany County

S. Marvin James & Co.'s No. 1 Riverside Ranch, C SW SW Section 10-13n-76, Riverside area, spudded and shut down to complete rigging and build camp.

Natrona County

Leo B. Murphy and others' No. 1, SE NW Section 29-33-80, North Platte, is shut down at 826 feet with a hole full of water from the Dakota. It will make a shutoff with 8¼-inch as soon as weather moderates and continue to the Lakota.

Platte County

T. R. Oberman's No. 1 Diamond ranch, NW SE Section 30-21-68, west of Chugwater, is drilling on iron at 280 feet.

Legislation

It is reported that Gov. Leslie A. Miller will recommend to the Wyoming legislature the enactment of a uniform oil and gas conservation measure prepared by the Oil States Advisory Committee. It will permit Wyoming to join with other states in a campaign to establish the posted price of crude at the wells upon a "fair and equitable" basis. Carl M. Cox, state land commissioner and a member of the advisory committee, is assisting in preparing the measure, which has not yet been introduced. A similar bill, prepared by Warwick M. Downing, a member of the oil states committee, has been introduced in the Colorado legislature and has been printed as House Bill No. 347. In Wyoming it will be necessary to create an oil and gas conservation commission which it is proposed to have include state officers. In Colorado the bill amends the present law creating a gas conservation commission.

MONTANA

Glacier County

One completion and no new locations were reported in the Cut Bank area. Cold weather delayed all operations. Dakota-Montana Oil Co.'s No. 1 Drumheller, SW SE NE Section 3-34-6w, was completed at a total depth of 2,958 feet and has not yet been put on the pump, but is estimated at 40 bbls. It has swabbed 345 bbls. to date.

Alberta-Pacific Consolidated Oil Co.'s No. 1 Kiesel, NE cor. NW Section 11-34-6w, is shut down at 2,693 feet waiting for 8¼-inch from its No. 1 Madison to shut off water. Same company's No. 1 Matson, NE SE NW Section 14-34-6w, is bottomed at 2,770 feet and running the 8¼-inch at 2,760 feet. Santa Rita Oil & Gas Co.'s No. 1 Tribal, C SW NE Section 15-35-6w, has rig completed and is ready to spud, and its No. 1 Jackson, C NW SW Section 25-34-6w, is shut down at 1,800 feet. W. M. Fulton and others' No. 1 Haggerty, NE cor. Section 16-34-6w, is rigged and ready to spud. Hannah-Porter Co.'s No. 1 Britton, NW NE NE Section 23-34-6w, is shut down after spudding, and B. E. Adams and others' No. 1 Britton, SE cor. NE Section 14-34-6w, is shut down at 2,842 feet. R. C. Tarrant's No. 1 McLellan, C SE SW Section 7-34-5w, has cleaned up fishing job and is drilling at 2,250 feet, and his No. 1 Haglund, Sr., SW cor. NW Section 13-34-6w, is shut down at 2,804 feet waiting for shot.

Carbon County

The operations of Ohio Oil Co. and Carbon Oil & Gas Co. in the Dry Creek Field were all at a standstill the past week. Frozen lines tied up the water supply.

Yellowstone County

W. E. Rice and others' No. 1 Hagerman, C W half SE Section 20-2n-23, Devil's Hole, is shut down at 2,350 feet on account of the weather. The 10-inch is at 2,285 feet.

SOUTH DAKOTA

Weaver Oil Co.'s No. 1, NW cor. Section 32-3s-22, Jackson County, which has been idle for more than a year at 2,430 feet, is reported preparing to resume. Above this depth it had a hole full of sulphur water.

OREGON

Coast Oil Co.'s No. 1 Coquille, in Coos County, near the town of Coquille, is reported to have had 200 feet of oil in the hole when casing was being pulled to resume. This well was drilled to 1,635 feet by the Fat Elk Oil Co. Last fall W. E. Marion and associates took an option on the well and deepened it 100 feet. This was followed by a deal to complete it and drill two more tests. J. Ellis Loreman is in charge of the work. Both men are known in the Rocky Mountain states, particularly Montana, where they operated.

United Development Co.'s No. 1 Doorman, near Ontario, in Malheur County, is reported to have resumed at 1,800 feet, where it had a show of gas, and to have material on ground for another well. Near Malheur Butte, west of Payette, in Idaho, Northwestern Oil Co. is reported to have spudded in. C. B. McMenamin has the contract.

Byron E. Hepler Heads Hope Engineering Co.

At a meeting of the board of directors of Hope Engineering Co., of Mount Vernon, Ohio, and New York, Byron E. Hepler was elected president. He succeeds Raymond S. Lord, who died recently. Mr. Hepler has been with the Hope company for many years and was vice president and treasurer until his election to the presidency. He is well-known in financial circles and throughout the gas industry. He has directed the operation of the company in the organization and construction of many of the nation's larger natural gas projects during the past several years.

Mr. Hepler is also president and director of Rio Grande Valley Gas Co. and General Funding Corp. He is vice president and director of Northwest Stellarene Co., Inc., and director of Kelly-Springfield Tire Co.

DEATH OF HARRY G. NYE

Harry G. Nye, president of the Nye Tool & Machine Works, of Chicago, and well known throughout the petroleum industry, died February 8.

1933

The years advance, and the world goes forward with them. Each new calendar brings with it a change in the methods of petroleum production. New methods create new needs, new equipment, new lubricants.

The last is a Humble specialty. Humble Rig Lubricants are as modern as next year's millinery. They are designed for the hard use of high-speed outfits. 1933 methods and 1933 equipment will find 1933 Humble lubricants to keep them company.

The work of Humble's expert technicians never ends. In the laboratory and in the field, Humble products are undergoing a continual process of careful testing, so that their service to the producing end of the petroleum industry may be broadened and the drilling operations of producers may be made more economical and efficient.

1933 is a new year, an unknown quantity; but one thing is certain: experienced drillers will continue to specify Humble lubricants for their rigs.

HUMBLE OIL & REFINING COMPANY

The red, white and blue Humble sign is a symbol of quality all over Texas.

Wildcat Operations in Kansas

(Continued from Page 68)

Snyder et al's No. 1 Carlson, SE cor. Sec. 4-19-3w.....S.D. 2,858 ft.
Sidwell et al's No. 1 Nichols, NE NW NW Sec. 28-17-1w..S.D. 1,205 ft.

MORTON COUNTY

Hydraulic Oil Co.'s No. 1 State Land, NW SE Sec. 22, 34-42w .....T.D. 3,640 ft.; temp abd

NESS COUNTY

Sinclair Prairie Oil & Gas Co.'s No. 1, C SW SW Sec. 16-19-21w .....Sil. 4,702-77 ft.; wtr.; abd.

NORTON COUNTY

Richards et al's No. 1 Colby, Sec. 17-4-21w.....Rig.

OSAGE COUNTY

Briggs & Smith's No. 1 Wood, SE NW Sec. 21-14-15.....S.O. 2,190-2,200 ft.; temp abnd

PRATT COUNTY

Ninnescah O. & G. Co.'s No. 1 Hardesty, SW SE SE Sec. 28-27-11w .....Drlg. 3,575 ft.

RENO COUNTY

Skelly Oil Co.'s No. 1 Cole, C SE NW Sec. 4-26-8w .....Drlg. 3,775 ft.
T. L. Johnson's No. 1 Crotts, NE NW NE Sec. 27-26-10w..Drlg. 250 ft.

RICE COUNTY

Langston et al's No. 1 Wells, NE SE Sec. 4-20-9w.....Rig.
J. Liggett et al's No. 1 Thodel, C NW NW Sec. 11-21-7w..S.D. 60 ft

SALINE COUNTY

Frank Dieter's No. 1 Fulton, SW NW Sec. 14-16-2w.....Rig.

SEDGWICK COUNTY

Cameron-Great Basin Oil Co.'s No. 1 Landon, C SE NW Sec. 13-28-2 .....Top Sil. 3,302 ft.

STEVENS COUNTY

Argus Prod.'s No. 2 Christopher, C NE Sec. 10-33-39w..S.D. 5,521 ft.

STAFFORD COUNTY

Atlantic Oil Prod. Co.'s No. 1 Gates, NW SE Sec. 27-21-13w .....Spudding.
Stringer et al's No. 1 Swindle, SW NE Sec. 2-25-11w..Spudded; S.D.

SUMNER COUNTY

Deal Oil & Gas Co.'s No. 1 Thompkins, SW cor. Sec. 26-33-1 .....Machine.

WOODSON COUNTY

Spencer et al's No. 1 Weidel, NW cor. Sec. 5-24-15 .....T.D. 1,578 ft; P.B. to 1,558 ft.

Wildcat Operations in Louisiana-Arkansas

(Continued from Page 78)

CADDO PARISH

Bolinger & Walker's No. 1 Thompson, SE SW Sec. 16-22-14 .....Drlg. 3,080 ft.

CLAIBORNE PARISH

Lane Oil Co.'s No. 1 Kiner, Sec. 2-21-7 .....T.A. 3,500 ft.
A. W. Phillips, Tr.'s No. 1 Jehu Knighton, 330 ft. N, 330 ft. E SW cor. NE SE, Sec. 31-20-7 .....Moving in rig.
United Gas Public Service Co.'s No. 1 Meadows, approximately 100 ft. S, center E½ E½ Sec. 13-21-5..Set 9⅝-in. 3,880 ft.
United Gas Public Service Co.'s No. 1 Temple, 1,340 ft. W, 660 ft. N, SE cor. Sec. 21-23-7 .....Began drlg. Feb. 12.
Webster Oil Co.'s (was Robertson & Aurand) No. 1 Smith, 200 ft. S and E, NW cor. SE NE Sec. 8-21-7..Shale 1,730 ft; S.D.

DE SOTO PARISH

Baggett et al's No. 1 Moore, 330 ft. S, 330 ft. W NE cor. NW, Sec. 1-13-15 .....Set 10-in. 60 ft.; S.D.
Coker et al's No. 1 Boone, 200 ft. N and W, SE cor. SW NW Sec. 12-10-11 .....Set 10-in. 60 ft.
Donley & Chastain's No. 1 H. Smith, 326 ft. W, 600 ft. N, SE cor. Sec. 31-14-15 .....S.D. 2,470 ft.
M. B. Gill's No. 1 W. J. Hill, 330 ft. N, 330 ft. E center Sec. 4-10-13 .....Began drlg. Dec. 1; cmtd. 12¼-in 111 ft.
Gounce et al's No. 1 Jenkins, NW cor. SE SW Sec. 35-13-12 .....Location.
Mrs. A. L. Ibach, tr.'s No. 1 Rambin, 250 ft. S and E, NW cor. NE NE Sec. 32-11-11 .....S.D. 2,892 ft.
E. T. Oakes' No. 1 R. H. Bryant et al, 200 ft. N and W, SE cor. NE NW Sec. 30-13-15 .....Cored Oolitic lime showing oil 4,240-60 ft; S.D. 4,584 ft.
DeSoto Dev. Co.'s No. 1 Nickey, Sec. 7-13-12 .....Partly rigged up and S. D.
Geo. L. Pace's No. 1 John Cole, 200 ft. N, 150 ft. E, SW cor. SE NE Sec. 11-11-11 .....Rig up.
G. C. Smith et al's No. 1 Wollums, 330 ft. N and W, SE cor. Sec. 30-12-12 .....S.D. chalk 1,520 ft.
E. J. Stanberry's No. 1 Naborton O. & G. Co., Sec. 32-13-11 .....S.D. fuel 1,250 ft.
State Drlg. & Prod. Co.'s No. 1 Wample, 330 ft. N and E, SW cor. NW SW Sec. 14-12-13 .....S.D.; repairs 1,700 ft.
Jack Whitson's No. 1 Sanders, 330 ft. N and E, SW cor. Sec. 19-11-13 .....Arranging to set 6-in. 2,320 ft.
Warren & Craig's No. 1 J. A. Wagner, 150 ft. S and W from C, Sec. 5-12-14 .....S.D. 2,360 ft.

GRANT PARISH

A. W. Phillips, tr.'s No. 1 Cameron, 200 ft. N, 200 ft. E, SW cor. SW NW Sec. 26-7-3w .....Cmtd. 10-in.; S.D. 100 ft.
H. H. Temple's No. 1 Edenborn Est., 2,640 ft. E, 550 ft. S, NW cor. Sec. 20-7-3w .....Derrick pattern.
H. H. Temple's No. 1 Guaranty State Bank, 200 ft. E, 200 ft. S, NW cor. Sec. 9-6-1 .....Location.

JACKSON PARISH

A. C. Thomas' No. 1 J. W. Johns, SE cor. NE NE Sec. 25-15-3 .....Derrick.

MOREHOUSE PARISH

H. G. Samson's No. 1 Barnes & Sullivan, NE cor. SW Sec. 12-21-7 .....Rigging up.
H. W. Snowden's No. 1 Meyers, 330 ft. S and E, SW cor. NE NE Sec. 15-23-7e .....S.D. 30 ft.

NATCHITOCHES PARISH

Allender & Rasmussen's No. 1 Cane River, 330 ft. N and W, SE cor. Sec. 61-6n-5w .....S.D. 100 ft.
W. M. Coates' No. 1 Ross Olive, Sec. 10-9-10, 660 ft. S and E from cen. of Sec. .....S.D. fuel, 2,150 ft.
DeSoto Bros.' No. 1 Smith, 1,000 ft. N, 2,000 ft. E, NE cor. Sec. 19, in Sec. 11-10-8 .....Began drlg. Feb. 1; S.D. 30 ft.
J. B. Oil Co.'s No. 1 Hankins et al, Sec. 67-10-7 .....S.D. 670 ft.
Natchitoches Pet. Co.'s No. 1 Edenbarn, 2,240 ft. W, 1,320 ft. S, NE cor. Sec. 4-11-6w .....Drlg. gumbo 2,785 ft.
Sampson et al's No. 1 Friedman estate, 406 ft. N, 423 ft. E SW cor. Friedman estate in Sec. 52-7-6 .....Moving in rig.
Texana Oil Co.'s No. 1 Clark-Morris Lbr. Co., 878 ft. N, 580 ft. E, C, Sec. 23-5-6 .....Set 6⅝-in. 3,300 ft.; tested S.W. 3,475 ft; W.O.

OUACHITA PARISH

Inabnet & Pipe's No. 1 Van Horn, 1,980 ft. N, 660 ft. E, C Sec. 14-18-5 .....Rig up; W.O.
Milhivan Gas Corp.'s No. 1 W. Va. L. & T. Co., 1,980 ft. E, 1,320 ft. N, center Sec. 10-17-5e .....Location.
Monroe Oil & Royalties Co.'s No. 1 Thieler, 150 ft. N and E, SW cor. SE NW Sec. 34-18-2e .....Drlg. 2,705 ft.
Southren Carbon Co.'s No. 15 Fairbanks, 1,920 ft. N, 660 ft. W, SE cor. Sec. 5-19-4 .....S.D. repairing rig.

RAPIDES PARISH

Evers & Collingsworth's (was A. G. Beck et al) No. 1 Hickman-Simmons Lbr. Co., 330 ft. S, 330 ft. E, NW cor. Sec. 40-4-1e .....Drlg. 500 ft.
Pet. Industries, Inc.'s No. 1 Lee Lbr. Co., 330 ft. N, 300 ft. W, SE cor. NW SE Sec. 13-5n-2e .....Derrick.

RED RIVER PARISH

Edward & Clay's No. 1 Delta Pecan Co., 1,600 ft. N, 450 ft. E, SW cor. Sec. 27-13-11 .....S.D. 1,700 ft.
H. M. Jones' No. 1 A. N. Sample, 330 ft. S, 330 ft. E, NW cor. Sec. 10-14-11 .....Rigging up.
G. T. Shaw et al's No. 2 Wilkinson, 330 ft. N, 460 ft. W, SE cor. NE SE Sec. 4-13-10 .....700 ft. oil in hole; fishing swab.

RICHLAND PARISH

Humble Prod. Co.'s No. 1 fee, SW NW Sec. 11-14-6 .....Location.

SABINE PARISH

Craft & Primm's No. 1 C. Alford, 720 ft. S, 460 ft. E, NW cor. SW NW Sec. 18-7-10 .....Bailed small S.O.; S.D. 2,660 ft.
Ellis & Dumas' No. 1 Pickering Lbr. Co., SE SE Sec. 13-4-13 .....Moving in rig.
Feazel & Davenport's (was Flinchbaugh & Myers) No. 1 Aaron, 350 ft. S and E, NW cor. Sec. 32-9-13.....Rigged up on second hole; began drlg. Feb. 10; 12½-in. 20 ft.
R. L. Gay, tr.'s No. 1-A Long Bell Lbr. Co., 430 ft. S, 200 ft. W, NE cor. NW NW Sec. 10-8-13 .....Cored hard lime and shale 7,109 ft.; S.D. 7,154 ft.
R. T. Henderson's No. 1 Sistrunk, 450 ft. N, 150 ft. W, C, Sec. 9-9-13 .....Cmtd. 6-in. 1,670 ft; bailed dry 1,999 ft; bailing to test 1,999 ft.
Helis et al's No. 1 Sabine State Bank, 350 ft. N and W, SE cor. SW SW Sec. 28-8-11 .....Cmtd. 6-in. top marl, 2,236 ft.; bailed dry; drlg. 2,385 ft.
Ab Jones' No. 1 Garcia, 300 ft. S and W, NE cor. NW SE Sec. 4-7-13 .....T.A. 2,070 ft.
G. B. Jordan's No. 1 Dew, 330 ft. N, 340 ft. E, SW cor. SW SE Sec. 24-8-11 .....Arranging set 2-in. tubing; T.D. 2,635 ft.
G. W. Langley et al's No. 1 Peavy-Wilson Lbr. Co., 330 ft. S and W, NE cor. Sec. 16-5-9 .....Derrick.
Geo. LeGrand's No. 1 McGough, 200 ft. S, 300 ft. E, NW cor. SW NW Sec. 2-8-10 .....S.D. 2,410 ft.
C. D. Lee, tr.'s No. 1 Whitney, 330 ft. N and W, SE cor. NW NE Sec. 12-9-14 .....S.D. 1,715 ft.
Ben Merritt's No. 1 Lucina, 400 ft. N, 378 ft. E, SW cor. SW NE Sec. 4-5-12 .....Derrick.
H. W. Perritt's No. 3 Brown Lbr. Co., 519 ft. S, 455 Roy Raines et al's No. 1 Beard, 720 ft. E, 700 ft. N, SW cor. SW SE Sec. 8-8-10 .....S.D. 1,200 ft.
Reeves & McNeely's No. 1 Ponder, 336 ft. N and W Thornton et al's No. 1 S. S. Martinez, 355 ft. S, 330 ft. W, NE cor. SE NE Sec. 4-7-13 .....S.D. 2,048 ft.
Otis A. Roberts' No. 1 Sabine Lbr. Co., 224 ft. S, 481 ft. W, NE cor. SW NE Sec. 5-7-13 .....S.D.; W.O. 2,500 ft.
Roberts & Sledge's No. 1 La. Long Leaf Lbr. Co., 390 ft. N, 468 ft. E, SW cor. NE SE Sec. 29-8-10 .....Began drlg. Jan. 27; 10-in. 27 ft; S.D. 1,400 ft.
Roberts & Sledge's No. 2 Sabine Lbr. Co., 803 ft. W, 796 ft. N, SE cor. SE SW Sec. 5-7-13 .....W.O.S.R. 2,430 ft.
Roshko & LaBane's No. 1 Maines, 427 ft. E, 114 ft. N, SW cor. SE SE Sec. 35-8-11 .....Drlg. 1,680 ft.
State Prod. Co.'s No. 1-B O. B. Davis, SW Sec. 17-7-10..Derrick.

CONVERSE DISTRICT

Alford & Cleary's No. 1 Jackson, 330 ft. N and E, SW cor. SE NW Sec. 10-9-13 .....Location.
Alford & Cleary's No. 1 Patrick, 330 ft. S and W, NE cor. SW NE Sec. 11-9-13 .....Location.
Cloud & Bolin's No. 1 Bowman-Hicks, SE cor. NE NE Sec. 26-9-13 .....S.D. 3,219 ft.
Evans Bros.' No. 1 Cranford, 300 ft. S, 300 ft. W NE cor. SE SE, Sec. 20-9-13 .....Cmtd. 8-in. top marl, 1,482 ft.; bailing to test 14-ft. limey shale; T.D. 1,504 ft; bailed small S.O.; S.D. 1,574 ft.
Lambert et al's No. 1 Edwards, 300 ft. S and E. NW cor. SW NW Sec. 29-9-13 .....Cmtd. 8¼-in. 1,585 ft; T.D. 1,600 ft.
H. C. Lessenger's No. 1 Bowman-Hicks, 330 ft. S, 330 ft. E, NW cor. Sec. 13-9-13 .....Rigging up.
Lee & Burnett's No. 1 Burckett, 330 ft. N and W, SE cor. NW SW Sec. 10-9-13 .....Tested dry 1,795 ft; W.O.
Hy Rockmill's No. 1 Cassell, 330 ft. S, 330 ft. W, NE cor. Sec. 35-9-14 .....Derrick.
Chief Oil Co.'s (was Rockmill et al's) No. 1 Bowman-Hicks, 330 ft. S and W, NE cor. NW Sec. 36-9-14....Tested dry; S.D. 1,681 ft.
Nick Barbare's No. 1 Ryals, 330 ft. S and E, NW cor. Sec. 27-9-13 .....Cmtd. 6-in. 1,515 ft.; top sand 1,535 ft; tested dry; W.O.; T.D. 1,555 ft.
Rockmill et al's No. 1 Patrick, 330 ft. S, 330 ft. E, NW cor. NE NW Sec. 21-9-13 .....S.D. 1,100 ft.
E. M. Self's No. 1 Paul, 330 ft. N and W, SE cor. NE SW Sec. 9-8-13 .....Derrick.
Roshko & Labarre's No. 1 Maines, 427 ft. E, 114 ft. N, SW cor. SE NE Sec. 35-8-11 .....S.D. 1,650 ft.
Sabine Prod. Co.'s No. 1 Whiting Corp., 150 ft. N and E, SW cor. Sec. 4-9-13 .....Top marl 1,470 ft. and cmtd. 6-in.; drlg. 1,730 ft.; tested S.W., small show gas 2,184 ft; S.D. 2,207 ft.
Skidmore & Mize's No. 1 Stoker, 440 ft. N, 225 ft. E, SW cor. SE NW Sec. 32-8-10 .....Junked 1,600 ft; arranging for new hole.
Southland Drlg. Co.'s No. 1 Frost Lbr. Co., 330 ft. N and W, SE cor. NE NE Sec. 13-9-11 .....Cored chalk and shale; S.D. 2,467 ft.
Triangle Drlg. Co.'s No. 1 La. Long Leaf Lbr. Co., 330 ft. N and W, SE cor. Sec. 11-6-11 .....S.D. 4,013 ft.
W. M. Ungerman's No. 1 F. Cross, 53 ft. S, 146 ft. W, NE cor. SW SE Sec. 25-8-11 .....S.O.; arranging use acid test; T. D. 2,635 ft.
Zwolle Prod. Co.'s (was Baird Bros.) No. 1 Tatum, SW NE Sec. 35-8-12 .....S.D. 2,360 ft.

TENSAS PARISH

H. V. Schumacker's No. 1 Currey, 1,320 ft. S, 1,320 ft. E, NW cor. Sec. 29-11-12 .....Reaming 3,673 ft.

UNION PARISH

E. S. Goens et al's No. 1 Frost Lbr. Co., 330 ft. S and E, NW cor. Sec. 17-22-2e .....Arranging D.S. test 2,092 ft.
W. D. Wingfield et al's No. 1 Union Sawmill Co., 330 ft. N and E, SW cor. Sec. 27-23-1e .....S.D. 2,100 ft.

VERNON PARISH

Earl Jones' No. 1 Willis, 350 ft. N 400 ft. E, SW cor. SE SE Sec. 32-3n-9w .....S.D. 820 ft.
Llano Co-operative Colony's No. 1 fee, NW NE Sec. 34-3n-9w .....Fishing reaming tool; T.D. 3,637 ft.

WEBSTER PARISH

J. E. Bundy's No. 1 Walker, 300 ft. S, 300 ft. W, NE cor. SE NW Sec. 11-18-10 .....Derrick pattern.
R. E. Silvey et al's No. 1 Drake est., C NE NE Sec. 14-19-10 .....Cmtd. 6-in. 2,317 ft; arranging test; show oil and gas; T.D. 2,835 ft.

WEST CARROLL PARISH

Mamie S. McCurry's No. 1 Richard & Donnaw, 300 ft. N and E, SW cor. Sec. 13-19-3e .....Cmtd. 8-in. 970 ft; drlg. 1,552 ft.

WINN PARISH

P.V.T. Oil Co.'s No. 1 Southern Paper Co., 150 ft. S and W, NE cor. SW Sec. 28-13-3 .....S.D. for 8-in. cag. 1,050 ft.

Arkansas

CLEBURNE COUNTY

Frank S. Craver et al's No. 2 Doniphan Lbr. Co., 700 ft. N, 200 ft. E, SW cor. SW Sec. 34-11-9 .....Cmtd. 8¼-in. 3,014 ft; drlg. rock 3,660 ft.

COLUMBIA COUNTY

Kendall Oil Co.'s No. 1 Fullenweider, 300 ft. S and E, NW cor. NE NE Sec. 13-17-22 .....Cmtd. 6-in. 2,460 ft.; claim show oil and gas 2,520 ft.; bailed down 1,100 ft; bailing S.W. 2,520 ft.

Allen E. Smith, tr.'s No. 1 J. M. Smith Est., 450 ft. N, 200 ft. E, SW cor. SE NW Sec. 5-16-12 ..... Derrick.

HEMPSTEAD COUNTY

A. G. Bagnell's No. 1 Trottner & Rhinehart (was reported Rhinehart & Trottner's No. 1 C. H. Jones), 330 ft. N, 330 ft. E, SW cor. SW SW Sec. 2-12-25... Derrick.

JEFFERSON COUNTY

R. V. Harrell et al's No. 1 McGoughey NW cor. Sec. 22-7-10 ..... S.D.; W.O. 512 ft.

LAFAYETTE COUNTY

Chas. McDonald's No. 1 Allen, 400 ft. N and W, SE cor. SE SW Sec. 2-13-26 ..... Arranging D.S. test; small S.G.; T.D. 1,537 ft; arranging D.S. test, 15-ft. gas sand 3,267 ft.

Sam E. Wilson et al's No. 1 Red River Lbr. Co., SW SW Sec. 10-19-25 ..... Derrick pattern.

LINCOLN COUNTY

Lawrence M. Cook, tr.'s No. 1 McGhee Planting Co., 420 ft. S, 220 ft. W, NE cor. NE SW ..... D.S. stuck 4,020 ft.

LITTLE RIVER COUNTY

American Portland Cement Co.'s No. 1 fee, 150 ft. S and E, NW cor. SW NE Sec. 21-12-32 ..... Drlg. 1,680 ft.

M. E. Sanderson's No. 1 Hale, 1,200 ft. E, 800 ft. N, SW cor. SE SE Sec. 22-12-29 ..... S.D. 1,405 ft.

MILLER COUNTY

Baker & McMurray's No. 1 Andrew Rose, 150 ft. S and W, NE cor. NE NW Sec. 4-16-26..... Recmtd. 10-in. 210 ft.

Capt. E. Byrd's No. 1 Miller Land & Lbr. Co., 1,320 ft. N and W, SE cor. Sec. 29-18-27 ..... Derrick.

Johnson & Burnham's (was John M. Burnham's) No. John DeGrozier's No. 1 Andrew Rose, 150 ft. S and E, NW cor. N½ N½ NW NW Sec. 4-16-26..... Location.

John DeGrozier's No. 2 Andrew Rose, 155 ft. S and E, NW cor. N½ NE NE Sec. 4-16-26..... Location.

Duluth-Ark. Oil Co.'s No. 1 H. E. Beck, 150 ft. N, 170 ft. E, SW cor. NW SW Sec. 34-15-26..... S.D. 3,100 ft.

Duluth-Ark. Oil Co.'s No. 1 Price, NW cor. NE Sec. 18-16-25 ..... Began drlg. Feb. 13; drlg. 100 ft.

Fitzwater et al's No. 1 C. J. Norsen, SW cor. SE SW Sec. 30-15-27 ..... S.D. 1,960 ft.

Fitzwater et al's No. 1 Fouke, 150 ft. S and W, NE cor. Sec. 11-17-27 ..... Cmtd. 12½-in. 105 ft; S.D.

Lee L. Foster's No. 1 Geo. Jones, 660 ft. N, 200 ft. W, SE cor. NW NW Sec. 29-16-26..... S.D. 1,240 ft.

J. T. Humphrey's No. 1 Grace, C SW SW Sec. 9-15-27.... Derrick.

Jenkins Bros.' (was Roy Jenkins et al's) No. 1 B. F. Smith, 330 ft. W, 330 ft. N, SE cor. SE SE Sec. 32-15-26 ..... Arranging to deepen 3,010 ft.

Jenkins Bros.' No. 2 Smith, 150 ft. S and W, NE cor. SE SE Sec. 32-15-26..... Location.

Jenkins Bros.' No. 3 Smith, 150 ft. S, 710 ft. W, NE cor. SE SE Sec. 32-15-26..... Location.

Jenkins Bros.' No. 4 Smith, 150 ft. S and E, NW cor. SE SE Sec. 32-15-26..... Location.

Magnolia Oil Co.'s No. 1 E. V. Olivet, 150 ft. S, 646 ft. E, NW cor. NE NE Sec. 4-16-26 ..... Cmtd. 12½-in. 209 ft.

Bob Manziel's No. 2 Smith, 150 ft. N, 660 ft. W, SE cor. NE SE Sec. 32-15-26..... Location.

Bob Manziel's No. 3 Smith, 150 ft. N and E, SW cor. NE SE Sec. 32-15-26..... Location.

Molar Oil Club's No. 1 A. M. Gibson, NW cor. SW Sec. 30-18-27 ..... Derrick.

W. E. Noel et al's No. 1 Dickson hrs., 1,980 ft. W, 660 ft. S, NE cor. Sec. 11-20-27 ..... S.D., W.O. 2,600 ft.

R. M. Olds' No. 1 E. D. Olivet, 150 ft. S and W, NE cor. NE SW Sec. 4-16-26..... Location.

Baker & McMurray's (was J. D. Reynolds') No. 1 E. L. Beck, 450 ft. E, 250 ft. N, SW cor. SW SE Sec. 35-15-26 ..... Derrick.

J. D. Reynolds' No. 1 B. F. Smith, 150 ft. N and W, SE cor. SE SW Sec. 32-15-26..... Location.

John C. Rogers' No. 1 Price, 230 ft. S, 400 ft. E NW cor. NW NW Sec. 17-16-25 ..... Rig up; S.D.

H. R. Sabens' No. 1 E. V. Olivet, 150 ft. S, 907 ft. W, NE cor. NE SW Sec. 4-16-26 ..... Location.

Simon & Birdwell's (was C. E. Starr's) No. 1 Barker, 330 ft. S, 150 ft. E, NW cor. NW SE Sec. 31-17-26... Began drlg. Jan. 23; 10-in. 197 ft

Sorrells & Tidwell's No. 1 Roy McCowan, 660 ft. S and E, NW cor. NW SE Sec. 32-15-28 ..... S.D.; 4-ft. sand 2,747 ft.

Stephens, Byers & Sartain's No. 1 Lowe, 600 ft. S, 200 ft. E, NW cor. SE NW Sec. 14-16-27 ..... S.D.; new boiler 3,119 ft.

A. C. Taylor's No. 1 Williams, 150 ft. N and E, SW cor. SW NE Sec. 5-16-26 ..... Location.

OUACHITA COUNTY

Chas. Steele et al's No. 1 Anderson, 155 ft. S, 150 ft. E, from center Sec. 26-12-18 ..... S.D. 1,140 ft.

PRAIRIE COUNTY

Powell Creek O. & G. Co.'s No. 1 Kloss, NE SW Sec. 3-4n-4w ..... Partly rigged up and S.D.

UNION COUNTY

Graves, Ferguson & Fuller's No. 1 Patterson, SW cor. NE NE Sec. 31-19-16 ..... Began drlg. Dec. 25; cmtd. 10-in. 103 ft; S.D.

Mamie McCurry et al's No. 1 Rowland, 300 ft. N and E, SW cor. Sec. 9-19-11 ..... Derrick.

Wilson & Chapman's No. 1-A D. Norman, 330 ft. S and E, NW cor. N½ NE SE Sec. 3-18-13 ..... S.D. 1,678 ft.

WOODRUFF COUNTY

B. F. Thompson's No. 1 Rosser, 500 ft. N and E, SW cor. SE SE Sec. 7-5n-2w ..... S.D.; W.O. 1,530 ft.

YELL COUNTY
(Cable tools)

Rainbow Oil & Gas Co.'s No. 1 Barrett SE cor. NE NE Sec. 14-5n-24 ..... S.D. 278 ft.

East Texas

BOWIE COUNTY

Roy Anderson et al's No. 1 Breckenridge, center 465-ac. Breckenridge tract in Nancy Dycas Sur. ..... S.D.; W.O. 3,052 ft.

Tom Bell et al's No. 1 Mars, 1,800 ft. N, 2,160 ft. W, NE cor. 465-ac. tract in O. D. Watson Sur. ..... Drlg. shale 1,616 ft.; (C.D.).

Lanford et al's No. 1 W. W. Whybark, 200 ft. S, 200 ft. W, SW cor. J. H. Dyer Sur. ..... S.D. 2,248 ft.

CASS COUNTY

Davis & Digg's (now Joiner Pet. Co.'s) No. 1 Roy Bryan, SW cor. Roy Bryan 88-ac. tr., Albert H. Latimer Sur. ..... S.D. 2,860 ft.

C. E. Murdock's No. 1 First National Bank, Evans Watson Sur. ..... S.D. 4,390 ft.

HARRISON COUNTY

Great Eastern Oil Co.'s No. 1 Rudd, Wm. Steele Sur. .... S.D.; second hole 960 ft.

MARION COUNTY

Baunoch Dev. Co.'s No. 1 Miller, 725 ft. N, 1,470 ft. E, SW cor. H. Fulgram Sur. (was Gist, Claunch & Dodson) ..... Drlg. 4,750 ft.

Dragon Oil Co.'s No. 1 R. W. Player, 330 ft. N and W, SE cor. 50-ac. tract in M. R. Noll Sur. ..... Began drlg. Jan. 23; top Nacatoch 1,078 ft.; D.S. test 1,886-92 ft.; 18 thribbles fluid, 25% wtr., 25% oil, 50% mud; drlg. 1,-925 ft.

Starling & Preston's No. 1 Henderson, R. Bennington Sur. H.R.S. ..... S.D. 2,600 ft.

PANOLA COUNTY

Carter-Skidmore et al's No. 1 C. J. Wooten et al, 785 ft. N, 185 ft. E, SW cor. C. J. Wooten tract in P. Martin Sur. ..... Rig up.

J. L. Nelson et al's No. 1 J. Williams, 300 ft. S, 700 ft. W, NE cor. Williams' 67-ac. tr., James Hanks Sur.... S.D.; W.O. 2,890 ft.; (C.D.).

Hampton Drlg. Co.'s No. 1 Lloyd Thompson, 330 ft. N, 330 ft. W, NW cor. C. Flanagan Sur. in Allen Leach Sur. ..... Rig up.

RED RIVER COUNTY

Ajo Oil Co.'s No. 1 Nichols & Daniels, center S 780 acres of 1,800-ac. tract in Hugh B. Shaw Sur. ..... Location.

Concord Oil Co.'s No. 1 Dillahunty, 500 ft. N, 200 ft. W, SE cor. Robt. Glass Sur. ..... Fishing overshot; T.D. 2,827 ft.

L. S. Priest et al's No. 1 R. W. Peck, 500 ft. W, 900 ft. N, most southerly SE cor. 220-ac. tract in Abram Wagley Sur. ..... S.D. 1,302 ft.

SHELBY COUNTY

J. H. Francis' (now Bob Chew et al's) No. 1 John Mims, Mary Smith Sur. ..... C.O.; arranging core; T.D. 3,448 ft.

General Minerals Co.'s No. 2 Pickering Lbr. Co., 660 ft. N, 400 ft. E, SW cor. D. S. Height Sur. ..... Arranging cmt. 6-in.; T.D. 4,416 ft.

Oil News' No. 1 Pickering, C. H. Patterson Sur. ..... Arranging set 5¾-in. 3,220 ft.

Neil Lease & Oil Well Synd.'s No. 1 W. P. Harvey, NW cor. W. P. Harvey 120 ac. in W. P. Harvey Sur. ..... Derrick pattern.

Prairie Creek Crude Co.'s No. 1 Ellington, 150 ft. and 200 ft. W from SE cor. 42-ac. tr., J. Burleson Sur. ... Arranging cmt. 4½-in..; T.D. 3,-244 ft.; (C.D.).

Louisiana-Arkansas Proven Areas

North Louisiana

BOSSIER—BELLEVUE AREA

Company, well, farm name, section and block— Remarks:

H. I. Morgan's No. 2 Smith, 1,520 ft. N, 660 ft. W, SE cor., Sec. 22-19-11 ..... Fishing D.S. 3,969 ft; red beds.

CADDO—RODESSA AREA

United Gas Public Service Co.'s No. 1 Levee Board, 1,980 ft. N, 1,320 ft. E, SW cor. Sec. 27-23-16 ..... S.D. for connections; T.D. 5,458 ft.

CADDO—BLANCHARD AREA

Louana O. & G. Co.'s No. 1 Carrie et al, 1,320 ft. W, 660 ft. S, NE cor. SE Sec. 32-19-16 ..... Set 2½-in. tubing 2,745 ft; T.D. 2,771 ft.

Louana O. & G. Co.'s No. 1 Waskom, 660 ft. N and E, SW cor. Sec. 29-19-16 ..... S.D. 84 ft.

Pyramid Oil Corp.'s No. 2 C. C. Wheeler, 660 ft. S, 250 ft. E, NW cor. Sec. 4-18-16 ..... Set 10-in. 40 ft.; drlg. 900 ft.

CADDO—HOSSTON

Caddo Prairie O. & G. Co.'s No. 1 Hawkins, C SE SW Sec. 14-22-15 ..... Drlg. 1,700 ft.

Gibson Oil Co.'s No. 1 J. H. Dominick, 330 ft. S and W, NE cor. SW NE Sec. 31-23-14 ..... Derrick.

Magnolia Pet. Co.'s No. 20 Doan-Thigpen, 600 ft. S, 470 ft. W NE cor. SE Sec. 6-20-15 ..... Began drlg. Feb. 13; 12½-in. 41 ft.; drlg. 860 ft.

Rice Bros.' No. 1 Evans, 747 ft. N, 150 ft. W, SE cor. NE NE Sec. 11-20-16 ..... Drlg. 400 ft.

DE SOTO PARISH

Abernathy et al's No. 1 J. M. Nabors, 2,485 ft. E, 1,185 ft. N, SW cor. Sec. 32-13-11 ..... S.D.; shale and shell 2,550 ft.

SABINE PARISH—ZWOLLE

Alford & Avant's No. 1 J. J. Small, 124 ft. N, 420 ft. E, SW cor. NE NW Sec. 13-7-10 ..... Derrick.

J. H. Askew's No. 3 Henderson, 400 ft. S, 150 ft. E, NW cor. SW SE Sec. 31-8-10 ..... Derrick.

Baird Bros.' No. 3 Martinez, 1,012 ft. S, 907 ft. E, NW cor. NW SW Sec. 2-7-13 ..... S.D. 2,484 ft.

C. W. Beene et al's No. 1 Cutrer, 200 ft. N and E, SW cor. NW Sec. 13-7-11 ..... Derrick.

Cameron Oil Co.'s No. 1 G. Martinez, 845 ft. E, 540 ft. N, SW cor. Sec. 2-7-13 ..... Cmtd. 6-in. 2,022 ft; T.D. 2,064 ft.

T. B. Carpenter's No. 1 Cutrer, 330 ft. S and E, NW cor. SE Sec. 13-7-11 ..... Cmtd. 6-in. 2,546 ft.

Coming Oil Co.'s No. 1 T. L. Andries, 415 ft. E, 365 ft. S, NW cor. NE SE Sec. 15-7-11..... Drlg. 680 ft.

Continental Drlg. Co.'s No. 1 Leone est., 70 ft. N, 200 ft. W, SE cor. Sec. 31-8-13 ..... Top marl, 2,210 ft; S.D. waiting for csg.

Crescent Drlg. Co.'s No. 1 Malbry, 660 ft. N and E, SW cor. SE NW Sec. 2-7-11..... Derrick.

Ed Deckard's No. 1 T. A. Webb, 150 ft. S and W, center Sec. 31-8-11 ..... Location (No. 1 drilled by A. D. King).

Edwards & Hubler's No. 1 G. Martinez, 510 ft. S, 280 ft. E, NW cor. SW SW Sec. 2-7-13 ..... Derrick.

Graham Prod. Co.'s No. 1 Lites, 330 ft. S and E, NW cor. SE SW Sec. 28-8-11 ..... Derrick pattern.

V. R. Hammons et al's No. 1 Travis, 540 ft. N, 150 ft. E, SW cor. NW SE Sec. 13-7-11 ..... S.D. chalk, 2,610 ft.

D. D. Holcomb's No. 2 Quayhaglew, 149 ft. N, 200 ft. E, SW cor. SE SE Sec. 11-7-11 ..... W.O.S.R. 2,652 ft.

E. L. Hunt's No. 2 Livingston, 330 ft. S and E, NW cor. SW NW Sec. 9-7-11 ..... Top marl 2,340 ft; cmtd. 6-in. 2,-330 ft; 1,500 ft. oil; W.O.S.R. after acid test; T.D. 2,396 ft.

Investors Prod. Co.'s No. 1 S. J. Williams, 660 ft. E, 600 ft. S, NW cor. Sec. 24-7-11..... Cmtd. 6-in. 2,642 ft.

H. M. Jones' No. 1 Raines, 300 ft. S, 150 ft. W, NE cor. NW NW Sec. 14-7-11 ..... Acid test 2,660 ft; 1,000 ft. oil in hole; W.O.S.R.

A. N. Landis' No. 1 La. Long Leaf Lbr. Co., 500 ft. S, 660 ft. W, NE cor. NE SW Sec. 29-8-10..... Began drlg. Feb. 8; 10-in. 40 ft.; drlg. 1,020 ft.

Lion Oil Ref. Co.'s No. 1 Trammell, 104 ft. N and E, SW cor. SE NE Sec. 30-8-11 ..... Cmtd. 6-in. top marl, 2,271 ft.; use acid; W.O. 2,585 ft.

Lowery & Green's No. 1 Adair, 330 ft. N and W, SE cor. SE SW Sec. 19-8-11 ..... Derrick.

Magnolia Pet. Co.'s No. 1 Ruth Gingeratt, 200 ft. N, 290 ft. W, SE cor. NW Sec. 30-8-11 ..... Began drlg. Feb. 12; 12½-in. 40 ft.; drlg. 1,500 ft.

Martin et al's No. 1 Porter, 330 ft. S, 330 ft. W, NE cor. NW SW Sec. 30-8-11 ..... Derrick.

L. K. McGuffin's No. 2 Chadick, 200 ft. S, 200 ft. W, NE cor. NW SW Sec. 32-8-10..... Location.

H. C. Moulding's No. 1 Brumley, 330 ft. N, 330 ft. E, SW cor. NW NW Sec. 2-7-11 ..... Drlg. 1,060 ft.

C. D. Neff, tr.'s No. 2 Snell, 400 ft. E, 330 ft. N, SW cor. SE SE Sec. 9-7-11 ..... Arranging pump 2,650 ft.

Nowlin & Cherry's No. 1 Turner, 109 ft. N, 330 ft. W, SE cor. Fractional NW NW Sec. 4-7-11 ..... Dry; arranging acid test 2,347 ft.

Pelican Nat. Gas Co.'s No. 20 La. Long Leaf Lbr. Co., 330 ft. S and W, NE cor. SE NE ..... Rigging up.

H. L. Patton's No. 1 Ponder, 330 ft. N and W, C Sec. 15-7-11 ..... Top marl 2,376 ft; S.D.

Perkins & Babbin's No. 1 Hopkins, 260 ft. S, 270 ft. W, NE cor. NE SW Sec. 11-7-11 ..... S.D.; W.O. 2,600 ft.

Picayune Oil Co.'s No. 1 Porter, 330 ft. N and W, SE cor. NW SW Sec. 30-8-11 ..... Top marl 2,372 ft; top chalk 2,-388 ft; arranging 6-in. 2,395 ft.

Pugh-Hickman Drlg. Co.'s No. 2 Blackman, 330 ft. S, 330 ft. E, NW cor. Sec. 36-8-12 ..... Rigging up.

Sam Riggs, tr.'s No. 1 Darby, N half SE Sec. 21-7-11 ... W.O. 2,556 ft.

Ritchey Prod. Co.'s No. 1 Stille, SE NW Sec. 36-8-12... S.D.; repairs, 1,510 ft.

Robertson Drlg. Co.'s No. 1 J. W. Hughes, 1,320 ft. W, C, Sec. 36-8-12 ..... Derrick.

Rotary Oil Corp.'s No. 1 Hale, 330 ft. S and E, NW cor. SW Sec. 1-7-12 ..... Bailed dry; W.O. 2,440 ft.

C. T. Ruffin's No. 1 Lilly, 545 ft. S, 200 ft. W, NE cor. NW NW Sec. 8-7-11 ..... Bailed dry on acid test; arranging pump; T.D. 2,376 ft.

E. M. Self's No. 1 Newton, 330 ft. S and W, NE cor. NE SE Sec. 1-7-11 ..... Rig up.

Scully & Beach's No. 4 Lafitte, 226 ft. E, 197 ft. S, NW cor. SW NW Sec. 18-7-11 ..... Derrick.
Scully & Beach's No. 5 Lafitte, 413 ft. E, 100 ft. W, NE cor. SW NW Sec. 13-7-11 ..... Arranging swab through tubing 150 ft. in oil; T.D. 2,492 ft.
Service Drlg. & Royalties Corp.'s No. 2 Smith, Sec. 13-7-11 ..... Arranging second acid test; T.D. 2,514 ft.
Ben F. Smith's No. 4 Turner, NE cor. NE NW Sec. 4-7-11 ..... Rigging up.
Simmons et al's No. 1 Fleming, E½ SE SE Sec. 11-8-13.. Rigging up.
Scully & Beach's No. 3 Lafitte, 1,030 ft. S, 134 ft. E, NW cor., Sec. 13-7-11 ..... W.O.S.R. 2,492 ft.
F. E. Stancil's No. 1 Pender, 278 ft. S, 297 ft. E, NW cor. NE SE Sec. 10-7-11 ..... Hole clean; using acid 2,593 ft.
State Prod. Co.'s No. 1 Keasels, 150 ft. N and W, SE cor. NW SW Sec. 3-7-13 ..... W.O.S.R. 2,427 ft.
State Prod. Co.'s No. 1 Liles, 150 ft. S and W, NE cor. SE SW Sec. 28-8-11 ..... Derrick.
State Prod. Co.'s No. 1 Sabine Lbr. Co., 385 ft. N, 100 ft. W, SE cor. NW SW Sec. 3-7-13 ..... S.D. 2,427 ft; 1,000 ft. oil; W.O.S.R. W.O.S.R.; 1,600 ft. oil in hole; T.D. 2,428 ft.
The Texas Co.'s No. 1 Pender, 1,490 ft. S, 300 ft. W, NE cor. Sec. 16-7-11 ..... Bailed small S.O. 2,365 ft.; dry; arranging acid test 2,675 ft.
The Texas Co.'s No. 1 C. E. Cooper, 408 ft. S, 175 ft. E. NW cor. NE SE Sec. 26-8-11 ..... Cmtd. 6-in. top marl, 2,304 ft.; drlg.
The Texas Co.'s No. 6 Stille, 285 ft. S, 900 ft. E, NW cor. NW NW Sec. 23-8-11 ..... Began drlg. Feb. 10; 10-in. 43 ft; drlg. 1,000 ft.
B. M. Thomasson's No. 1 W. & H. Andries, 500 ft. N, 150 ft. W, center Sec. 22-7-11 ..... Cmtd. 6-in. 2,300 ft; top marl, 2,575 ft; top chalk 2,600 ft; dry 2,750 ft; W.O.
B. R. White et al's No. 1 Cooper, 330 ft. S and E, NW cor. SW NW Sec. 32-8-11 ..... Derrick.
B. R. White et al's No. 1 Stille, 630 ft. W, 295 ft. N, SE cor. NE SW Sec. 35-8-13 ..... S.D. 1,205 ft.
Ewolle Prod. Co.'s No. 1 Tatum, 650 ft. E, 330 ft. N, C Sec. 26-8-13 ..... S.D. 2,360 ft.

Arkansas

OUACHITA COUNTY—SMACKOVER

L. L. McDonald's No. 1 J. A. Robertson, 300 ft. S and E, NW cor. NE NW Sec. 25-15-16 ..... Rigging up.

East Texas

PANOLA COUNTY

Daisy O. & G. Co.'s No. 1 Rucks, John Palmer Sur. ..... S.D. 3,359 ft.

Mississippi

HINDS COUNTY

Geo. P. Adkins et al's No. 1 Woodland Hills, 400 ft. N and W SE cor. NW NE Sec. 26-6-1e ..... Derrick.
Ferguson-Fuller et al's No. 1 W. B. Montgomery, 610 ft. S, 600 ft. W, NE cor. NW NW Sec. 26-6-1e ..... Rigging up.

RANKIN COUNTY

J. A. Baker et al's No. 2 Rankin Side Dev. Co., Sec. 6-6-3e ..... S.D. high wtr.; top chalk at 3,461 ft.

Wildcat Operations in Mississippi

AMITE COUNTY

Company, well, farm name, section and block—	Remarks:
Magnolia State O & G. Co.'s No. 1 Anderson, C NE NW Sec. 14-3n-3e	S.D. 400 ft.

CLARKE COUNTY

F. X. Gowans et al's No. 1 Effring, SE NE Sec. 13-1n-14e. S.D. 194 ft.

COVINGTON COUNTY

Eastman Gardner Interest's (was Modiselle Drlg. Co.)

HINDS COUNTY

Lionel Pet. Co.'s No. 1 J. L. Gaddis, 1,980 ft. E, 1,400 ft. S, NW cor. Sec. 7-7-3w ..... Rigging up.
National Gas Co. of Miss.' No. 1 M. C. Halder, 160 ft. E, 660 ft. N, SW cor. Sec. 16-6n-1e ..... S.D. for csg. 810 ft.

JASPER COUNTY

S. B. Jones' No. 1 Bank of Philadelphia, 460 ft. N and W, SE cor. Sec. 35-3n-12e ..... Top Eutaw (Blossom) 5,004 ft.; coring 5,024 ft.

JACKSON COUNTY

Gulf Ref. Co. of La.'s No. 1 Danciger, 2,440 ft. S, 1,120 ft. W, NE cor. Sec. 27-4s-8w ..... Began Dec. 6; core drlg.

LAMAR COUNTY

Chas. W. Gerr et al's No. 1 Jordan, NW cor. SW Sec. 1-2s-15w ..... Derrick.
Stauffer & Kourt's No. 1 Bond, SE NE Sec. 18-2n-14w .... D.S. stuck 3,025 ft.

MONROE COUNTY

P. J. McAlpine's No. 1 Rye, Sec. 23-15s-17w ..... Drlg. sandy slate 2,709 ft.

NEWTON COUNTY

Bob Dalton's No. 1 Majure, 480 ft. N, 300 ft. E, SW cor. SE Sec. 25-4n-11e ..... Sandy shale 2,450 ft.; S.D.

RANKIN COUNTY

Home Oil Prod. Corp.'s No. 1 So. Jackson Land Co., 25 ft. S, 130 ft. W, NE cor. NW SW Sec. 23-5n-1e ..... S.W. and abd 2,500 ft.
Love Pet. Co.'s No. 3 Int. Lbr. Co., 450 ft. S and E, NW cor. Sec. 25-6n-3e ..... Chalk 2,963 ft.; S.D.
Majestic O. & G. Co.'s No. 1 Elton Lbr. Co., Sec. 10-4n-3e.. Derrick.

SCOTT COUNTY

M. U. Culley et al's No. 1 Owens, Sec. 2-5-9 ..... S.D. 750 ft.

SUNFLOWER COUNTY

WEBSTER COUNTY

P. J. McAlpine's No. 1 Hensley, Sec. 15-21-11 ..... Cored Tuscaloosa 1,890 ft; S.D.

WILKINSON COUNTY

Foster Creek Oil Co.'s No. 1 Foster Creek Lbr. Co., Sec. 12-3n-3w ..... Drlg. sandy shale 1,720 ft.

Wildcat Operations in Alabama

BALDWIN COUNTY

(Cable tools)

Company, well, farm name, section and block—	Remarks:
H. H. Givens' No. 1 Ashman, Sec. 16-6-5e ..	Drlg. 500 ft.

CULLMAN COUNTY

C. V. Corey's No. 1 King, NE cor. NE NW Sec. 35-8-4w.. S.D. 710 ft.

LAMAR COUNTY

De Soto O. & G. Co.'s No. 1 Gardner, NW NW Sec. 32-11s-14w ..... S.D.; shale 3,200 ft.

WASHINGTON COUNTY

South Ala. O. & G. Co.'s No. 1 Wilson, Sec. 25-1n-1w ..... S.D. in sand 2,959 ft.

Wildcat Operations in Southwest Texas

(Continued from Page 70)

BASTROP COUNTY

Champion's No. 1 Rivers, center W½ of 800-ac. tract in Osborne Sur. ..... T.D. 1,520 ft; S.D.
J. E. Emanuel's No. 1 H. Klemm, 617 ft. from W line, 360 ft. from S line of tract in R. S. Teel Sur. ..... T.D. 243 ft; S.D.
Humble O. & R. Co.'s No. 1 Betty White, Sur. 2, 2mi. SE from No. 1 Annie Hausler ..... Location.
Humble O. & R. Co.'s No. 1 Annie Hausler, 750 ft. from W line, 330 ft. from S line of lease in Samuel Wolfenberger Sur. ..... T.D. 2,577 ft; comp. 57 bbls. first hr.; 78 bbls. second hr. and until choked to ¼-in. when flowed 7¼ bbls. hrly., 350 lbs. on tubing; 500 lbs. on csg.
Marts & Beavens' No. 1 Roy Rivera, 860 varas from SE lines, 54 varas from NE lines of Mrs. Lucy Rivers' 582-ac. Elizabeth Standifer Sur. 24 ..... T.D. 1,990 ft; drlg.
Properties Trading Co.'s No. 1 Henry Freitag, 400 ft. from SE line, 1,800 ft. from NE line of P. Conley Sur. ..... T.D. 2,224 ft; S.D.
Nelson Pruitt's No. 1 C. Lentz, 330 ft. from NE line, 2,050 ft. from SE line of 400-ac. tract in J. B. Lentz Sur. ..... T.D. 2,501 ft; waiting on csg.
H. Robertson's No. 1 Schmidt, 35 ft. from N line, 850 ft. from W line of D. H. Dyer Sur. ..... T.D. 400 ft.; S.D.
Texas and Gant's No. 1 Mikulec, 330 ft. to NW and SW lines of tract in Wm. Barton Sur. ..... T.D. 1,340 ft; S.D.

BEE COUNTY

Nichols & Bruner's No. 1 Grover Heidenfels in John Bryan Sur., 891 ft. from S line, 1,950 ft. from E line of tract ..... T.D. 4,440 ft; S.D. in top of Jackson; showed gas at 4,365 ft.
W. C. Pool's No. 1 J. C. Weed, 150 ft. N along E line of H.&G.N. Sur. from NE cor. of Mary O'Connor lease, thence 450 ft. E at right angles ..... Rigged up.

BELL COUNTY

James Scoggins' No. 2 Warrick, 1,000 ft. to NW line, 2,400 ft. to NE line of 335-ac. tract in Ingram Sur. .. T.D. 1,481 ft; fishing.

BEXAR COUNTY

C. I. Albertson's No. 1 Hoch, 750 ft. from S line, 650 ft. from W line of 339-ac. tract, in Jose Maria Baerera Sur. ..... T.D. 600 ft.; gas blow out and bridged.
Amaden-Ingersoll-Miller's No. 1 Strumberg, 450 ft. to W line, 1,020 ft. to N line of tract, 12 miles SW of San Antonio ..... T.D. 1,135 ft; waiting for pump.
R. S. Boling's No. 1 J. J. Appelt, 150 ft. from N and W lines of tract in M. Uriegas Sur. ..... T.D. 220 ft; comp. fishing; resumed drlg.
C. J. Lecompte's No. 4 R. Diaz, 324 ft. NE of No. 1 in Diaz Sur. ..... T.D. 100 ft.; drlg.
Motes-Campbell's No. 1 Pruitt, 550 ft. NE of Trussell's No. 1 Pruitt, 54 varas from E line of tract in Samuel McCollough Sur. ..... T.D. 400 ft; set 8-in. csg.
Ethridge et al's No. 1 Bilharts, 150 ft. to N and E lines of SE 100 acres of Bilharts 360-ac. tract in F. Rolon Sur. ..... Moving in.
Rollin V. Hill, Sr.'s No. 1 Max Boeck, 1,700 ft. from N line, 2,700 ft. from E line of tract in J. R. Shepherd Sur. ..... T.D. 406 ft; standing.
M. L. Howard's (Allen Park) No. 1 James Watson, 12 miles S from San Antonio ..... T.D. 2,535 ft; taken over from Allen Park; plugging back 10 ft.
George O'Neill's No. 1 R. V. Sauer, Sur. 12 of A. Estrada grant ..... T.D. 451 ft.; abd.
O. L. Ray's No. 1 Thos. Dillon, 3,500 feet from NW line, 1,750 ft. from most southerly SW line of de Luna grant in southern part of county ..... T.D. 325 ft.; reaming and drlg; carrying 10-in. down.
H. G. Venable's No. 2 F. Dulling, 1,500 ft. W of center of E line of tract ..... Location.
W. L. Whicker's No. 1 Bilharts ..... Location N of No. 1 Strumberg and W of No. 1 Carruth.

BLANCO COUNTY

H. T. McGee's No. 1 Forbes, cen. Sec. 167 ..... Spudded in on 6,000-ac. blk.
C. L. McLeary's No. 1 Meier ..... T.D. 860 ft; S.D. in lime.
Hardy Sitton's No. 1 Luders, 150 ft. from S line, 1,420 ft. from E line of James Stanford Sur. ..... T.D. 700 ft; S.D.

CALDWELL COUNTY

Fred Adams' of Lockhart No. 1 Robertson, 450 ft. from N and W lines of Robertson 100-ac. tract in John Neill Sur. ..... Rigging up.
Louis Crouch's No. 1 Sue Neelan, 1,500 ft. to SE lines, 150 ft. from NE lines of 200-ac. tract in John B. Gray Sur. ..... T.D. 1,266 ft; drlg. in Georgetown lime.
E. D. Herne's No. 1 M. C. and P. W. Jeffrey 126-ac. tract, 150 ft. from N and E lines of tract in James George Sur. ..... Set surface pipe, waiting for wtr.
E. L. Hope and Joe Cole's No. 1 M. August, 150 ft. from NE line, 165 ft. from NW line of tract in A. Floyd Sur. ..... T.D. 500 ft; drlg.
E. R. Thomas' No. 1 Alexander, 563 varas from NW lines, 334 varas from NE line of 158 acres in Spiller Sur. ..... T.D. 2,303 ft; reaming to test.

DIMMITT COUNTY

Motes-Campbell's No. 1 Denton, 170 ft. from E line, 250 ft. from S line of Tracts 33 and 34, Sec. 60 .... T.D. 1,370 ft; waiting for big rig.

DUVAL COUNTY

Cowden et al's No. 1 State Bank of Alice, 209 ft. to S line, 1,450 ft. to W line of E. Valentine Sur. No. 26.. Steel derrick.
Huff & Kyle's No. 1 A. Roach, 865 ft. from E line, 45 ft. from S line of Blk. 7, Sur. No. 457 ..... T.D. 172 ft; no report.
Ed Leach et al's No. 1 C. J. Bain, 330 ft. to S line, 330 ft. to E line of NW SW of Sur. 264 ..... T.D. 250 ft; standing.
Magnolia Pet. Co.'s No. 1 Duval County Ranch Co., Sur. 208 ..... Derrick.
Newton et al's No. 1 Welder-Wood, 5,550 ft. from W line, 4,590 ft. from N line of Sur. 102 ..... T.D. 700 ft; drlg.
C. P. Scott's No. 1 J. W. Kidd, 990 ft. from N and E lines of SE of Sur. No. 66 ..... T.D. 2,264 ft; standing.
Smith & Capps' No. 2 Peters, 1,300 ft. E of No. 1 Peters in Sur. No. 178 ..... Spudded in.
Smith & Capps' No. 2 Peters, 990 ft. from W line, 330 ft. from N line of NW SW Sur. 178 ..... Rigging up.
Smith & Hunter's No. 1 Manuel Olivares, 1,500 ft. SE of No. 1 Pena ..... Rigged up.
Wm. B. Stewart's No. 1 Duval County Ranch Co., 990 ft. to S and E lines, of NE of Sur. 362..... Drlg. wtr. well.
Wm. B. Stewart's No. 2 Duval County Ranch Co., 330 ft. from N and W lines of N¼ SW of Sur. 362..... T.D. 1,360 ft; drlg.
S.R.C. Oil Co.'s No. 1 Duval County Ranch Co., 150 ft. from N line, 4,200 ft. from W line of Sur. 192..... Rigging up.
S.R.C. Oil Co.'s No. 1 Hagist, 3,670 ft. from W line, 2,970 ft. from S line of Sur. No. 267 ..... T.D. 1,168 ft.; broke down.
Shasta Oil Co.'s No. 1-B Peters, 990 ft. from W line, 330 ft. from N line of NW SW Sur. No. 176..... T.D. 100 ft; drlg.

FRIO COUNTY

James E. Greenlee's No. 1 W. W. Burns, 612 vrs. to N line, 900 vrs. to W line of Antone Hutzler Sur. ..... Rigging up.

GILLESPIE COUNTY

Rod Lagra's No. 1 Stephen, 500 ft. from N and W lines of A.B.&M. Sur. No. 969 ..... Spudded in.

GUADALUPE COUNTY

B. E. Brock's No. 1 Ogletree, 1,400 ft. from W line, 450 ft. from S line of tract in Robert Smith Sur..... T.D. 2,240 ft; drlg.
Keene & Russell's No. 1 Lowman, 300 ft. from E line, 350 ft. from N line of tract in George Allen Sur. .... T.D. 330 ft; hole caved in on tools; to be comp. by Clint Lanier.
James Douglas' (Tyler) No. 1 E. Wilson, 202-ac., 150 ft. from N and W lines of E. Pettus Sur. ..... Location.
Seguin Oil Co.'s No. A. D. Mebane 61 ac., 440 ft. from W line, 500 ft. from S line, J. G. King Sur. ..... Location.
W. A. Scrutchin's No. 1 S. J. Lowman, 170 ft. from N line, 195 ft. from W line of 10-ac. tract, in Blk. 1, Sec. No. 1 of S. J. Barnes Sur. ..... T.D. 410 ft; standing.
Smith's No. 1 Lowman, offsetting old test of Humble... T.D. 450 ft; standing.

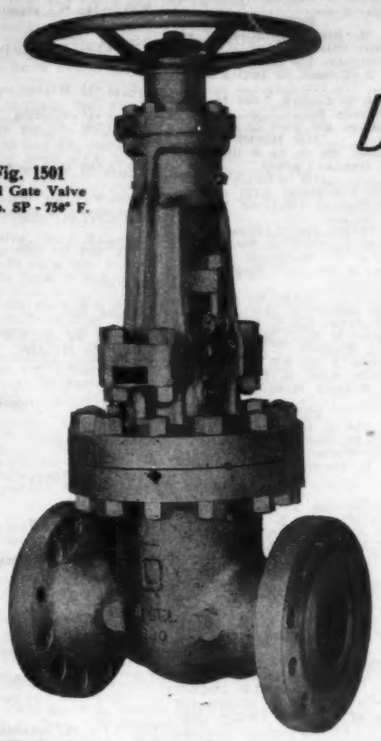

Fig. 1501
Steel Gate Valve
900 lb. SP - 750° F.

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SINGLE STAGE—HIGH PRESSURE

GONZALES COUNTY

Antibus et al's No. 1 James, 6,350 ft. from N line, 1,300 ft. from E line of Mary A. Williams Sur. ..... T.D. 2,480 ft; S.D.

Edmiston & Kirby Pet. Co.'s No. 1 J. W. Ward, Jr., 300 ft. from N line, 833 ft. from W line of tract in Dan McKay Sur. ..... T.D. 1,592 ft.; standing.

HIDALGO COUNTY

Garrett-Kanolles' No. 1 J. B. Brock, 7 miles W and N from Mission (on Monte Cristo road) ..... T.D. 4,590 ft; standing.

Carl & Johnston's No. 1 Doughty, 187 ft. from S and E lines of Lot 11, Blk. 5 of Subd. of Indios Ranch Sur. in N. Hidalgo ..... T.D. 1,475 ft; set csg.

Palm City Pet. Co.'s No. 1 J. T. Lomax, 7,500 ft. from S and E lines of San Roman Sur. ..... T.D. 1,445 ft.; drlg.

Dayle L. Smith's No. 3 Daskam, SW part of county.... T.D. 1,706 ft; set csg.

JIM HOGG COUNTY

Dole Pet. Co.'s No. 1 W. Allen, 990 ft. to E line, 1,320 ft. to N line of Blk. 13, Randado grant ..... T.D. 3,684 ft; standing.

JIM WELLS COUNTY

Humble Oil & Ref. Co.'s No. 1 Fuhrkin, 1,117 ft. from N line, 450 ft. from W line of 150.77-ac. tract in Phillips Sacks Sur. ..... T.D. 5,247 ft; abd.

F. A. Lain's No. 1 Vernon Porter, 800 ft. from S line, 400 ft. from W line of 200-ac. tract in Sur. 25 ..... T.D. 3,611 ft; abd.

Magnolia Pet. Co.'s No. 2 A. A. Seeligson, 3,000 ft. from E line, 150 ft. from S line of V. Canales Sur. No. 218 ..... Location.

KARNES COUNTY

W. R. Campbell's No. 1 E. C. Gilbert, C. Martinez Sur. .. Rigging up.

A. E. Edmiston et al's No. 1 G. W. Cross, 600 ft. from E line, 150 ft. from N line of tract in M. N. Reed Sur. .. Spudded in and S.D.

Hindeman et al's No. 1 F. C. Weinert ..... T.D. 1,000 ft; drlg.

Sunshine Oil Co.'s No. 1 Canon, 3 mi. NE Karnes City.. Making location.

Luppett & Mull's No. 1 Smith, 3,500 ft. from N line, 300 ft. from E line of Francis Haskins Sur., 3½ miles W of Helena ..... T.D. 20 ft; no report.

KENDALL COUNTY

Dupree et al's No. 1 Hagg, 600 ft. to S line, 2,700 ft. to W line of tract, B.B.B.&C. Sur. 91 ..... Repairing rig.

Verland Trust's No. 2 Willie Werner, 1,400 ft. N and 150 ft. W of No. 1 P. B. Sterling's No. 1 Willie Werner ..... T.D. 970 ft; C.O.

KERR COUNTY

Van Duyn & Moore's No. 1 Nowlin, 2,000 ft. from E line, 2,200 ft. from N line of James R. Bettner Sur... T.D. 700 ft; drlg.

Verde Oil & Gas Co.'s No. 1 J. D. Witt, 1,320 ft. from N line, 1,320 ft. from W line of Sec. 1,923 in Hamilton Sur. ..... T.D. 118 ft.; standing.

KLEBERG COUNTY

Harry Clark's No. 1 V. J. Kivlin, 360 ft. from E line, 400 ft. from S line of Sec. 39, Blk. 3, Kleberg Town & Improvement Co. Sur. ..... Location.

Harris et al's No. 1 Dennett, 400 ft. from S line, 760 ft. from E line of Blk. 7, Sec. 38, Kleberg Town & Imp. Co. Subd. ..... T.D. 2,797 ft; waiting on D.S.

H. Carter's No. 1 R. H. Simmons, 150 ft. from S and W lines of tract in Sec. 7, King Sur. No. 3. ..... T.D. 3,205 ft.; standing.

LA SALLE COUNTY

Interstate Oil Industries, Inc.'s No. 1 J. F. Mayes, 600 ft. from S and W lines of Blk. 20, L.&G.N. Sur. No. 19 ..... T.D. 2,825 ft; standing.

Salt Lake's No. 1 May ..... T.D. 2,925 ft; standing.

LIVE OAK COUNTY

J. A. Harper's No. 2 fee, center of Blk. 40 ..... T.D. 968 ft; drlg.

Humble O. & R. Co.'s No. 1 Albert West, 4,000 ft. S of river, 150 ft. from NW line of tract in Thos. Hammond Sur. ..... T.D. 1,200 ft.; drlg.

Homer T. Lamb's No. 1 J. T. Brown, 150 ft. from N line, 2,450 ft. from W line of 692-ac. tract in M. Hely Sur. ..... T.D. 1,123 ft.; drlg.

C. J. Webster Oil & Gas Co.'s No. 1 O. F. Akers, 300-ac. tract in T. Henry Sur. ..... T.D. 100 ft.; standing.

LEE COUNTY

Paton Bros.' No. 1-B Turner, 424 ft. from NW line, 375 ft. from NE line of 51.9-ac. tract in David Hudson Sur. ..... T.D. 2,540 ft; drlg.

Sayre Oil Co.'s No. 1 Rister, 150 ft. from S and E lines of N 100-ac. Rister tract in J. V. Jamison Sur... Derrick.

MAVERICK COUNTY

B. R. Garrett and Mason Altgelt's No. 1 J. D. Beck, 730 ft. N of S line, 2,778 ft. W of E line, about 1¼ miles north of Eagle Pass on Del Rio Highway, Sur. 44 ..... T.D. 118 ft.; S.D.

H. E. Lewis' No. 1 Kifuri, 640 varas E of river, 140 varas from S line of Poindexter & Burns Sur. 31 .... T.D. 500 ft; drlg.

McMULLEN COUNTY

French Oil Corp.'s No. 1 Shiner ..... Derrick.

Gant & Teas' No. 1 E. R. Hagist, 330 ft. from N and W lines of SW of H.&T.C. No. 24 Sur. ..... T.D. 557 ft.; drlg.

Jaqua & Crow's No. 1 Hagist, 330 ft. from N and W lines of R. W. Mills Sur. No. 467 ..... T.D. 920 ft.; drlg.

Chas. B. Loftin's No. 1 R. H. Brown, in R. H. Brown Sur. No. 8 ..... T.D. 715 ft.; abd.

Greenwood & Calvert's No. 1 G. A. Booth, 3,300 ft. from NW line, 7,000 ft. from SW line of 4 miles SW from Calliham ..... T.D. 200 ft.; drlg.

Chas. B. Lofton's No. 2 R. H. Brown, 1,000 ft. from E line, 5,280 ft. from S cor. Duncan Sur. ..... T.D. 955 ft.; plugging back to 820 ft; set cmt. Monday; setting 18-in pipe; oil and sand 812 ft.

Plymouth Oil Co.'s No. 1 Miles Ranch, Sur. 149 ..... Making location.

C. C. Shumway's No. 1 Shiner, 400 ft. from W line, 200 ft. from N line of Blk. 45 of Shumway Subd. of Shiner ranch ..... T.D. 1,250 ft.; S.D.

S. R. C. Oil Co.'s No. 1 La Chusa, 1,320 ft. to S and E lines of Sur. 47 ..... T.D. 150 ft.; drlg.

Tarver & Nance Co.'s No. 2 Dickson Farm Mrtg. Co., 700 ft. due W of No. 1, 900 ft. from NE line, 300 ft. from SE line of survey, Sec. 45 ..... T.D. 621 ft.; set csg.; W.O.

Whisenant & Trenchard's No. 1 Martin ..... Moving in rig.

MEDINA COUNTY

James E. Groenlea's No. 1 Feasler, 600 ft. from N line and 2,400 ft. from E line of L. G. Harrison Sur. No. 799 ..... T.D. 1,543 ft; standing.

MILAM COUNTY

Bridwell's No. 1 Terry, 1,100 ft. from N line, 800 ft. from W line of tract in Jose Leal Sur. ..... T.D. 2,460 ft; S.D.

Clark et al's No. 1 Hoppe, 450 ft. to NE lines, 450 ft. to SE lines of E. Hoppe 60-ac. tract in Juan Jose Acosta Sur. ..... T.D. 103 ft; standing.

Ed Clark's No. 1 Pritchard, 1,100 ft. to SE lines, 700 ft. to NE lines of 163-ac. tract in F. Ernst Sur., 6½ miles NE Thorndale ..... Rigged up.

NUECES COUNTY

John F. Camp's No. 1 King, 150 ft. from N and W lines of E½ Sec. 29 of Richard King Subd. Sur. .. Bldg. derrick.

Miller et al's No. 1 Harney, 200 ft. from NW line, 1,850 ft. from SW line of 445-ac. tract in Gregoria Farias Sur. ..... Moving in tools.

George Noble's No. 1 Homeland Syndicate, 300 ft. to SE and SW lines of Blk. 3, Sec. 12, 5 miles S Corpus Christi ..... Location.

STARR COUNTY

Adams & Modest's No. 1 Wood, 2,070 ft. from W line of Porcion 84, Camargo, and 1,472 ft. N of Missouri Pacific Railroad ..... Spudded in.

W. P. Chancellor's (Byron & Tharp) No. 1 A. Guerra, 26,000 ft. from S line, 2,600 ft. from E line of Share No. 6 of San Jose grant survey, from NE cor. of county ..... T.D. 1,100 ft.; tested a little oil and gas; drlg. ahead.

W. P. Chancellor's No. 1 A. Guerra, 26,000 ft. from S line, 2,600 ft. from E line of Share 4, of San Jose grant ..... T.D. 920 ft; standing.
B.&B. Oil Co.'s No. 1 Crown Brick & Tile Co., 1,800 ft. S of State Highway No. 4 and 580 ft. from W lines of Porcion 87, near La Puerta ..... T.D. 4,526 ft.; fishing.
Clark & Johnson's No. 1 Doughty, 187 ft. from S and E lines of Lot 11, Blk. 5, subd. of Los Indios ranch .. Rigging up.
Coastal O. & G. Co.'s No. 1 Kelsey Bass, 445 ft. to N line, 150 ft. to W line of Tract 52, Sur. 2, Porcion 86. T.D. 1,860 ft.; changing to heavie rig.
F. R. Cooper's No. 1 J. M. Martinez, 150 ft. to S and E lines of A.B.&M. Sur. No. 135 ..... T.D. 760 ft.; drlg.
John J. Erickson's No. 1 J. B. Brinton, 341 ft. from W line, 271 ft. from S line of Share 60, Partition of Porciones 88 and 89, Camargo ..... Location.
Four-In-One Oil Synd.'s (J. E. Waldron) No. 1 Marks Estate, 200 ft. SW of center of Sur. No. 483 (in Blk. 10) ..... Spudded in.
Goodwin & Yantis' No. 1 Walker, 450 ft. SE of W line of Isabel Lopez property in Sur. 767 ..... T.D. 800 ft; drlg ahead; reported abd. at 1,002 ft. in error.
Goodwin & Yates' No. 1 Kelsey Bass, 150 ft. to N and W lines of Blk. 45, Sur. 2, Por. 86 ..... Location.
Great Plains Oil Co.'s No. 1 Sanchez, 660 ft. from W line, 330 ft. from S line of SE of NW of Sur. No. 344 ..... T.D. 1,928 ft; waiting for wtr.
Great Plains Oil Co.'s No. 2 Sanchez, 2,050 ft. to S line, 1,645 ft. from most westerly W line of Sur. 344 T.D. 1,000 ft.; abd.
Jeffries and Lambeth Drilling Co.'s No. 1 Starr County Cattle Co., 11,572 ft. from N line, 2,490 ft. from E line of Porcion 89, Jurisdiction of Camargo ..... T.D. 2,100 ft.; drlg.
Boyd C. Jones' No. 1 Garza, 2,407 ft. from N and E lines of Share 26, Part. of Porciones 67-72, Jurisdiction of Mier ..... T.D. 560 ft.; abd.
LaJoya Oil & Gas Co., in Porcion 28 NE part of county Location.
R. McCormick's No. 1 I. G. Garcia, 1,260 ft. from N line, 438 ft. from E line of Blk. 11-B, Subd. of Pors. 71-72 ..... Location.
A. C. McGaughey's No. 1 Fernandes Bros., 1,800 ft. from W line, three-quarters of a mile from Rio Grande River, in Porcion 99, Jurisdiction of Camargo ..... T.D. 180 ft.; closed deal to be comp. by B. & B. Oil Co. to 4,500 ft.
D. A. Miller's No. 1 Madrigal, 4,827 ft. to N line, 1,987 ft. to E line of Share 15, Porciones 67, 72, 1 mile NE of Roma ..... T.D. 380 ft; standing.
Percy Brenton's No. 1 Starr County Cattle Co., 150 ft. from W line of Por. 89, 150 ft. north of Highway No. 4, Camargo Sur. ..... Taken over by Witherspoon Oil Co.
John Pope, trustee's No. 2 H. Gonzales, 150 ft. W of cen. of E line of Sur. No. 339 ..... Spudded in.
J. W. Seaward's No. 1 F. Dawson, 495 ft. from W line, 240 ft. from S line of tract in Blk. 6, Share 3-B of Porcion No. 70 ..... Location
George Stobaugh's No. 1 Seabury et al, 150 ft. from S and W lines of Porcion 107 ..... T.D. 278 ft.; no report
Travelers Oil Co.'s No. 1 C. Ramos, 2,000 ft. from SW lines, 2,640 ft. from NW lines of Sur. 150 ..... Derrick.

TRAVIS COUNTY

J. L. Collins & Co.'s No. 1 John Carlson, 630 ft. to NE lines, 1,570 ft. from SE lines of 177-ac. tract in M. W. Smith Sur. ..... T.D. 1,500 ft; S.D.
Robinson et al's No. 1 O. L. Brady, 155 ft. to N line, 300 ft. to W line, McMillan Sur. ..... Location.
Watson et al's No. 1 Maggie Kee Brady, 880 vrs. to NW line, 54 vrs. to NE line of Elkins McMillan Sur. ..... T.D. 470 ft; drlg. lime.

UVALDE COUNTY

J. V. Scoggin's No. 1 Olive Henry, 1,100 ft. from N and E lines of tract in Hugh Kilgore Sur. ..... T.D. 670 ft.; S.D.

VICTORIA COUNTY

John F. Camp's No. 1 Mrs. Etta Terrell, 3½ miles SW from Victoria ..... Gulf and Stoneleigh O. & G. Co interested.

WEBB COUNTY

Earl Calloway et al's (Osborne) No. 1 Gates, 330 ft. from N and W lines, SE Sec. 14, Blk. 1 (Gates ranch), C.C.S.D.&R.G.N.G.R.R. Sur. ..... Derrick.
J. W. Edwards' No. 1 M. D. Slator, 1,320 ft. to NE and NW lines of Blk. 72, Slator Subd. of J. V. Borrego grant ..... T.D. 2,330 ft.; drlg.

WILSON COUNTY

Sexton Pet. Co.'s No. 1 Joe Gutzeit (1,032-ac.), 150 ft. from W line, 150 ft. from S line of road of F. Flores No. 18 Sur. ..... Spudded in.

WILLIAMSON COUNTY

McLean et al's No. 2 R. C. Miller, 800 ft. to S line, 100 ft. to W line of tract in B. Manlove Sur. ..... T.D. 1,669 ft; S.D.
E. F. Smith's No. 1 H. C. Braker, 1,600 ft. to SW lines, 900 ft. to NW lines of E. J. Mahan Sur. ..... T.D. 513 ft.; S.D.
R. S. Wilson's No. 1 Gray ..... T.D. 1,140 ft; treating with acid.

ZAPATA COUNTY

Hamilton, Brower & Crow's No. 1 Slator, 2,111 ft. from SW line, 1,980 ft. from SE line of Blk. 1, Subd. of Slator ranch in J. V. Borrego grant ..... T.D. 1,000 ft; drlg.
T. J. Murray's No. 1 S. Vela, 235 ft. from NE line, 158 ft. from SE line of Blk. 145, Doty Subd., Share 4, El Grullo grant ..... T.D. 750 ft; drlg.
Stevens & Brown's No. 1 J. M. Garcia, 150 ft. from NE line, 260 ft. from SE line of Blk. 102, Sur. 434.. Location.
A. C. Savey et al's No. 1 Flores, 150 ft. from NW line, 306 ft. from NE line of Blk. 8, Share 1 of P. A. Richer Subd. of Porcion No. 36 ..... Location.
S. R. C. Oil Co.'s No. 1 T. Trevino, 660 ft. to S and E lines of Blk. 5, Sur. 60 ..... T.D. 1,703 ft; tested gas 350 lbs. in 5 min.; setting csg.

ZAVALA COUNTY

Adair & Daniel's No. 1 Gates, 1,320 ft. from N line, 1,320 ft. from E line of Hooper & Wade Sur. No .13.. T.D. 3,920 ft; standing.

Southwest Texas Proven Areas

Week Ending February 18

RIDDLE POOL—BASTROP COUNTY

Company, well, farm name, section and block— Remarks:

Ogden & Reed's No. 8 Riddle, 600 ft. S and E of No. 1 Riddle in 94.5-ac. tract in Joshua Gray Sur. ..... Rigging up.
Ogden & Reed's No. 2 J. W. Mears, 600 ft. W of No. 1 Leach Sur. ..... Location.
Ogden & Reed's No. 2 Riddle, 600 ft. N of No. 1, J. Gray Sur. ..... Location.
Ogden & Reed's No. 3 Riddle, 600 ft. N of No. 2, J. Gray Sur. ..... Location.
Ogden & Reed's No. 4 Riddle, 600 ft. S of No. 1, J. Gray Sur. ..... Location.
Ogden & Reed's No. 5 Riddle, 600 ft. E of No. 3, J. Gray Sur. ..... Location.
Ogden & Reed's No. 6 Riddle, 600 ft. E of No. 2, J. Gray Sur. ..... Location.
Ogden & Reed's No. 7 Riddle, 600 ft. E of No. 1, J. Gray Sur. ..... Location.

PETTUS FIELD—BEE COUNTY

J. L. Mauldin's No. 2 fee, 300 ft. S of No. 1 fee, George A. Kerr Sur. ..... T.D. 2,891 ft; setting pipe; tested 31 joints oil and 50 bbls. in 15 min.

NORMANNA POOL—BEE COUNTY

Gulf Coast Oil Co.'s No. 5 Hicks, 600 ft. E of Nichols Oil Co.'s No. 2 Hicks ..... T.D. 4,060 ft; coring.

TULETA POOL—BEE COUNTY

Taber et al's No. 1 Harris, 150 ft. from N and W lines of Blk. 13, Sec. 13, Ragsley Subd. of Uranga grant .. T.D. 4,323 ft; reinstated; plugging back to Pettus sand; perforating csg. at 4,110-30 ft.
The Texas Co.'s No. 2 Cox, 330 ft. from S and E lines, of SE SW Sec. 2, Ragsley Subd. Uranga Grant Sur. Spudded in.
The Texas Co.'s No. 2 Cox, 330 ft. from S and E of SE of SW Sec. 2, Ragsley Subd. of Uranga tract.... Location.

COOKSEY POOL—BEXAR COUNTY

Chiquita Oil Co.'s No. 4 A. C. Hunter, 660 ft. E of No. 3 Hunter in Sec. 14, J. Martinez Sur. ..... T.D. 1,350 ft; drlg.

GAS RIDGE—BEXAR COUNTY

American Gas Co.'s No. 5 W. H. Kennon, 1,750 ft. from S line, 2,000 ft. from E line of 400-acre tract in Maria F. Rodrigues Sur ..... T.D. 2,230 ft; T.A.

ECKERT POOL—BEXAR COUNTY

Alamo Nat. Gas Co.'s No. 3 J. H. Gembler, 150 ft. from N and E lines of tract in A. Manachaca Sur. 51. T.D. 1,216 ft.; standing
Bowman & Richards' No. 3 Halbardier, 1,320 ft. to E along N line of Jose M. Peres Sur. from W of NW cor., 160 ft. S of N line of same survey ..... Location.
Charles P. Cartter's No. 2 Gembler ..... Rigging up.
C. W. Richards' No. 4 Halbardier, J. M. Peres Sur. .... T.D. 713 ft; comp. 6 bbls.
F. H. Eckert & Son's No. 2 A. C. Brehm, 150 ft. from E line, 310 ft. N of No. 1 ..... T.D. 711 ft; setting csg.
F. H. Eckert's No. 6 Louis Brehm, 320 ft. S of No. 5, 150 ft. to S line, 480 ft. to E line, Boquar Sur. ..... Spudded in and S.D.
Hatlin Oil Co.'s No. 15 I. A. Beck, 150 ft. from S and E lines of tract in J. Montez Sur. ..... T.D. 723 ft; set csg.
D. C. Pegg's No. 2 Walter Gembler, 150 ft. to S line, 150 ft. to E line of Walter Gembler 20-ac., Manachaca Sur. No. 51 ..... T.D. 665 ft; setting liner.
V. R. Swearingen's No. 11 Halbardier, 400 ft. SE of No. 10 Halbardier, J. P. Peres Sur. ..... Location.

DUNLAP POOL—CALDWELL COUNTY

Bob Rose's No. 2-B Walker 46-ac. tract, 360 ft. from NW line, 500 ft. from SW line of tract in Solomon Seal Sur. ..... T.D. 2,372 ft.; waiting for pump.

SALT FLATS—CALDWELL COUNTY

Hickman et al's No. 1 C. A. Dickerson, 150 ft. N of cen. of S line of tract in John D. Rains Sur. T.D. 2,363 ft; S.D.

NORTH GOVERNMENT WELLS POOL—DUVAL COUNTY

R. B. Byrd's No. 1-A Wright, 330 ft. from N and W lines of Sur. No. 101 ..... T.D. 2,298 ft; running tubing.
R. B. Byrd's No. 4 Wright, 1,086 ft. from W line, 330 ft. from S line of Sur. No. 101 ..... T.D. 2,332 ft; abd.
R. B. Byrd's No. 5 Wright, 330 ft. from N line, 1,470 ft. from W line of Sur. 101 ..... Spudded in.
Central Producers' No. 6 Tuck-Johnson, 330 ft. to N and E lines of SW SW of Sur. 42 ..... T.D. 50 ft.; drlg.
H. H. Coffield's No. 5 H. Wendt, 310 ft. to E line, 330 ft. to S line, SE NE Sur. 45 ..... Derrick blew down.
W. T. Daniels' No. 1 F. J. Smith, 330 ft. from N and W lines of SW of NE of Sur. No. 46 ..... T.D. 900 ft; waiting on boiler.
Hester Bros.' No. 1 fee, 330 ft. from S and E lines of NE of Sur. No. 47 ..... Rigging up.
Highland Oil Co.'s No. 7 Lundvall, 330 ft. to N and E lines of S½ of NE of Sur. 42 ..... Location.
Highland Oil Co.'s No. 8 Lundvall, 330 ft. to S and E lines of S½ of NE of Sur. 42 ..... Location.
Magnolia Pet. Co.'s No. 5 J. V. Allen, 330 ft. from S line, 990 ft. from W line of S½ SE of Sur. No. 42.... T.D. 2,275 ft; waiting on cmt.
Magnolia Pet. Co.'s No. 6 J. V. Allen, 330 ft. from S line, 990 ft. from E line of S of SE of Sur. No. 42 .. Location.
Magnolia Pet. Co.'s No. 4 B. White, 330 ft. from N line, 990 ft. from W line of N NW Sur. 64 ..... T.D. 400 ft; drlg.
Navarro Oil Co.'s No. 1 C. W. Hahl, 370 ft. from S line, 335 ft. from E line of SW of No. 360 Sur. ..... T.D. 2,290 ft; 200 bbls. daily.
San Diego Oil Corp.'s No. 5 E. Riley, 330 ft. from S and W lines of NW NW of Sur. No. 46 ..... Location.
San Diego Oil Corp.'s No. 2 L. Bennett, 500 ft. N of No. 1, 250 ft. to W line of SE SW of Sur. No. 44.. Location.
San Diego O. & G. Co.'s No. 2 Heller, 300 ft. to S and W lines of SW SE of Sur. 44 ..... Location.
The Texas Co.'s No. 6 Tuck Johnson, 990 ft. from S and E lines of N½ SW of No. 42 Sur. ..... T.D. 2,255 ft; comp. gas well 10,000,000 ft., 750 lbs.
The Texas Co.'s No. 7 Johnson, 990 ft. from E line, 330 ft. from N line of S½ NW 3-4, Sur. No. 42..... Location.
Whisenant et al's No. 5 Hahl, 330 ft. to N and W lines of SW SW of Sur. 44 ..... Location.
Wilkins Seacord's No. 2 E. C. Lundell, 150 ft. from N and E lines of Sur. No. 48 ..... Rigging up.
Windsor Oil Co.'s No. 3 Cummings, 330 ft. from N line, 330 ft. from E line, E¼ NW NE Sur. 44 ..... T.D. 2,295 ft; est. 1,500 bbls.

SOUTH GOVERNMENT WELLS POOL—DUVAL COUNTY

Humble O. & R. Co.'s No. 11 Paul White, 990 ft. from S line, 1,320 ft. from E line of Sur. No. 249 ..... Derrick.

SARNOSA FIELD—DUVAL COUNTY

Atravasada Oil Co.'s No. 1 P. Henrandez, 330 ft. to NW and SW lines of E half of Sur. 574 ..... T.D. 1,714 ft; standing.
Sun Oil Co.'s No. 2 Cuellar (Cano), 150 ft. from SW and SE lines of E quarter of Sur. No. 576..... Rigged up.
The Texas Co.'s No. 3-A Duval County Ranch Co., 1,053 ft. to SE lines, 330 ft. to SW lines of N¼ of Sur. 574 ..... T.D. 2,690 ft; drlg.

DARST CREEK FIELD—GUADALUPE COUNTY

John F. Camp's No. 3 Sue Denman, 1,025 ft. S of road, 540 ft. to E line of tract in Wm. Arrington Sur. .... T.D. 3,467 ft; drlg.

HORD'S CREEK—GOLIAD COUNTY

Sam Vanderweiss' No. 1 Kaufman, 3,700 ft. NE of NE line of B. Merrill Sur., 300 ft. NW of NW line of Vincente Ramos Sur. ..... T.D. 4,440 ft; drlg.

ALWORTH FIELD—JIM HOGG COUNTY

H. C. Cate's No. 1 B. J. Leyendecker, 70 ft. to E line, 320 ft. to S line, Blk. 10, Sur. 143 ..... T.D. 1,132 ft; standing.

SANDIA POOL—JIM WELLS COUNTY

Crude Oil Royalty Co.'s No. 1 Allen (first carried as Hughes & Long's No. 1 Wade), Cen. Blk. 2, Wade ranch ..... Rig on ground.
Larcro Gas & Pet. Co.'s No. 3 Wade, 2,000 ft. S, 33 deg. W of No. 2 Wade, thence 1,970 ft. N. 57 deg. W. Material on ground.

JACOB POOL—McMULLEN COUNTY

Lefevre & Spice's No. 1 Jacob, 2,666 ft. to S line, 1,260 ft. to E line of J. Poitevent Sur. 53 ..... Moving in.
Longhorn Oil Co.'s No. 2-A Lark, 660 ft. N of No. 1-A Lark ..... T.D. 1,080 ft; abd.
Longhorn Oil Co.'s No. 2-A C. T. Lark, E. W. B. Scrugham Sur. ..... Rigging up.
Tarver & Nance's No. 1 J. Dickinson Farm Mtg. Co., 150 ft. to E line of McMullen County, 200 ft. to NW lines of tract, or 200 ft. SE of SE line of Campbell Berry Sur. ..... T.D. 1,019 ft; abd.
Tarver & Nance's No. 2 Dickson Farm Mrtg. Co., 700 ft. due west of No. 1 ..... T.D. 150 ft; drlg.

ADAMS FIELD—MEDINA COUNTY

Yantis Oil Co.'s No. 1-A Adams, 50 ft. from No. 1 ..... T.D. 680 ft.; S.D.

SAXET POOL—NUECES COUNTY

Gibson Oil Co.'s No. 1 F. J. Smith, 330 ft. to S and E lines of Shepherd Farm Lots No. 35 ..... T.D. 974 ft; drlg.
Gulf Coast Oil Co.'s No. 2 Perkins & Lagasse, 650 ft. from N line, 990 ft. from E line, Sec. 26, Shepherd farm lots ..... T.D. 5,060 ft; plugging back to 4,500 ft.
Gulf Port Oil Co.'s No. 1 Isencee, 330 ft. to N and W lines of 300-ac. tract in C. Land Sur. ..... Location.

Gulf Port Oil Co.'s No. 3 Frank Bliss, 1,899 ft. to N line, 330 ft. to E line of 336-ac. tract in J. W. Stevens Sur. No. 406 ..... T.D. 4,059 ft; S.D.
Gulf Port Oil Co.'s No. 3 Humphreys, 115 ft. from N line, 330 ft. from W line of lease (S offset to No. 1 Gibson, Rand Morgan Sur.) ..... Location.
Holliday et al's No. 1 Smith ..... T.D. 4,091 ft; coring sand.
Houston Oil Co.'s No. 2 McGregor, 460 ft. W of No. 1.... T.D. 4,676 ft; comp. 500 bbls. dly.
Oso Drillers' No. 2 Roark ..... T.D. 4,886 ft; setting screen.
Shasta Oil Co.'s No. 1 Quiros, 330 ft. from N and E lines of Lot 30, Sur. No. 913 ..... T.D. 4,366 ft; drlg.
Texas Coast Oil Co.'s No. 1 Clark-Morgan, 330 ft. from S and E lines of N½ of Sur. No. 406..... T.D. 4,097 ft; testing sand.
Titus & Calloway's No. 3 Lagasse, 330 ft. from N and W lines of E half of Blk. 25 of Shepherd farm lots.. Derrick.
Titus & Calloway's No. 1 Ran Morgan, 330 ft. from N and E lines of W 80 acres of E 160 acres of N half of 423 acres of B.S.&F. Sur. No. 403 ..... Derrick.
Violet Oil Co.'s No. 1 McGregor-Polk ..... T.D. 4,874 ft; setting csg; 5 fourbies oil on D.S. test.

REFUGIO POOL—REFUGIO COUNTY

Edwin M. Jones' No. 4 Mitchell, 900 ft. S of No. 1-B Mitchell ..... Location.

MATHIS POOL—SAN PATRICIO COUNTY

Geo. W. Scruggs' No. 1 Collins ..... T.D. 600 ft; drlg.

WHITE POINT FIELD—SAN PATRICIO COUNTY

Saxet Oil Co.'s No. 19 Rachel ..... T.D. 4,939 ft; tested S.W.; drlg. deeper.

LOS OLMOS POOL—STARR COUNTY

Austin et al's No. 1 Kelsey Bass, 150 ft. to N and W lines of NW of NW of Sur. 4, Porcions 75, 76, 77, Jurisdiction of Camargo .. .. Rigging up.
Brooks O. & G. Co.'s No. 2 Kelsey Bass, 450 ft. from N line, 150 ft. from E line of NW SW Sec. 6, Subd. of Porcions 75, 76, 77, Camargo ..... T.D. 437 ft; 6,000,000 ft. gas.
Columbia Royalty Co.'s No. 1 Kelsey Bass, 150 ft. from N and E lines of Sur. 6, Sub. of Porcs. 75, 76 77, Jurisdiction Camargo ..... Location.
Floyd-Doyno-Tolanda' No. 1 Seabury, 340 ft. from S line of Doyno 80 acres, Share 5, Por. 75, Camargo Sur.. T.D. 432 ft; moving in big rig.
Goodwin & Yantis' No. 1 Kelsey Bass, 150 ft. to S and E lines of SE of NW of Sur. 8, Porcions 75, 76, 77 ... Rigging up.
Goodwin & Yantis' No. 1 Seabury, 150 ft. from N and E lines of N 80 ac. of Share 8, W portion of Porcion 75 Camargo ..... T.D. 934 ft; drlg. ahead.
Hooks & Weaver's No. 13 Kelsey Bass, center of E¾ of NE SW Sec. 6, Pors. 75, 76, 77, jurisdiction Camargo ..... T.D. 483 ft; 20 bbls. daily.
Hooks & Weaver's No. 14 Kelsey Bass, 150 ft. from E line, 250 ft. from S line, NE SW Sec. 6, Porcions 75, 76, 77, Camargo ..... T.D. 600 ft; drlg.
Los Olmos Oil & Gas Co.'s No. 42 Kelsey Bass, 450 ft. from E line, 420 ft. from N line of SE of NW Sec. 7, Porcions 75, 76, 77, Camargo ..... T.D. 210 ft.; drlg.
Los Olmos Oil & Gas Co.'s No. 44 Kelsey Bass, 300 ft. from E line, 120 ft. from N line of SE of NW Sec. 7, Porcions 75, 76, 77, Camargo ..... Spudded in.
Los Olmos Oil & Gas Co.'s No. 45 Kelsey Bass, 300 ft. from E line, 120 ft. from N line of SE NW Sec. 7, Porcions 75, 76, 77, Camargo ..... Location.
Los Olmos Oil & Gas Co.'s No. 46 Kelsey Bass, 300 ft. from E line, 120 ft. from N line of SE NW Sec. 7, Porcions 75, 76, 77, Camargo ..... Location.
Los Olmos O. & G. Co.'s No. 47 Kelsey Bass, 200 ft. to E line, 105 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
Los Olmos O. & G. Co.'s No. 48 Kelsey Bass, 425 ft. to E line, 105 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
Los Olmos O. & G. Co.'s No. 49 Kelsey Bass, 650 ft. from E line, 105 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
Los Olmos O. & G. Co.'s No. 51 Kelsey Bass, 425 ft. to E line, 330 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
Los Olmos O. & G. Co.'s No. 52 Kelsey Bass, 650 ft. to E line, 330 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
Los Olmos O. & G. Co.'s No. 54 Kelsey Bass, 475 ft. to E line, 555 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
Los Olmos O. & G. Co.'s No. 55 Kelsey Bass, 700 ft. to E line, 555 ft. to S line of NE NW Sur. 7, Por. 75-76-77 ..... Location.
R. A. Mitchell's No. 1 Kelsey Bass, 150 ft. from S and W lines of NW SE of Sur. 8, Subd. Porcions 75, 76, 77, Jurisdiction of Camargo ..... T.D. 385 ft; drlg.
C. L. Sinclair's No. 2 Kelsey Bass, 150 ft. to S line, 1,050 ft. to W line of SW of SW of Sur. 6, Porcions 75, 76, 77 ..... T.D. 402 ft.; fishing.

RIO GRANDE CITY POOL—STARR COUNTY

Chiquita Oil Co.'s No. 1 Jones & Doyno, 870 ft. to W line, 150 ft. to N line of Blk. 5, Share A-77, Por. 81, Camargo ..... T.D. 1,480 ft; bailing.
Howard Stagg's No. 1 Ida Davis, 150 ft. from S and W lines of Blk. 14, Tract 4, Porcs. 18, Camargo.... T.D. 300 ft; drlg.
Mundy and others No. 1 Salines, 190 ft. to S and W lines of Blk. 12, Share C-38, Porcions 80 and 81, Camargo ..... T.D. 1,460 ft; abd.

AVIATOR POOL—WEBB COUNTY

Nueces Dev. Co.'s No. 1 Puig, 150 ft. from W line, 200 ft. from N line of Blk. 12, Edington Subd., Alberca Grant Sur. ..... T.D. 582 ft; standing.

LAUREL POOL—WEBB COUNTY

L. M. Kaiser's No. 1 Garcia & Villareal, 150 ft. to N and W lines of Blk. 3, Sur. 1,099 ..... T.D. 2,301 ft; tested small oil and gas show.
Newton Drilling Co.'s No. 1 A. Garcia, 2,550 ft. from S line, 2,340 ft. from W line of Sur. No. 52, 3 miles SW of Carolina Texas Field ..... T.D. 2,250 ft; drlg.
G. B. Parr's No. 1 Gates et al, 330 ft. to S and E lines of Blk. 3, Sur. 373 ..... T.D. 2,142 ft; comp.; 650 lbs. pressure; est. 5,000,000 ft. gas.
Reward Oil Co.'s No. 1 Garcia & Villareal Co., 330 ft. from N and W lines of NW SE of Sur. 1,140..... Location.
R. R. R. Oil Co.'s No. 1 Garcia & Villareal, 330 ft. to N and W lines of Blk. 11, Sur. 338 ..... Abd.
Sal-Mar Oil Corp.'s No. 1 Vela, 660 ft. from NW and SW lines of Blk. 16, Sur. No. 1,011 ..... Location.
Smith & Story's (Wolcott & Rahmet) No. 1 Sarah Lloyd, 600 ft. from W line, 150 ft. from S line of SW SE (Blk. 14), Sur. 23 ..... T.D. 1,710 ft; standing.
South Texas Oil Co.'s No. 1 Garcia & Gates, Sur. 372.... T.D. 1,000 ft; drlg.
South Texas Oil Co.'s No. 1 Garcia & Villareal, Sur. 1,099.. Location.
Whisenant & Trenchard's No. 1 Duval County Ranch Co., 150 ft. to N and W lines, Blk. 17, Zapata County School Lands, Sur. 101 ..... Spudded in.

MOCA POOL—WEBB COUNTY

S. R. C. Oil Co.'s No. 1 Duval County Ranch Co., 1,969 ft. N, 250 ft. E from Moca Oil Co.'s No. 1 in League 3 of Zapata County school land ..... Location.
Whisenant & Trenchard's No. 1 Duval County Ranch Co., 150 ft. from N and W lines of Blk. 17, Duval County school land, Sur. No. 101 ..... T.D. 875 ft; coring.

ESCOBAS POOL—ZAPATA COUNTY

Lefevre et al's No. 1 M. Garza Hrs., 330 ft. from NW and SW lines of Blk. 53, C. A. Douglas Subd., Zerro ranch, Comitas Grant Sur. ..... Spudded in.
The Texas Co.'s No. 17 Measles ..... Making location.
The Texas Co.'s No. 19 Measles, 450 ft. N 74 deg. E of No. 15 Cerrito Blanco grant ..... T.D. 1,170 ft; W.O.C.

Gulf Coast Fields and Wildcats

(Continued from Page 77)

BARBERS HILL—CHAMBERS COUNTY

Humble O. & R. Co.'s No. 2 Kirby, Henry Griffith League, 100 ft. W of E line of lease and 200 ft. N of No. 1 ..... Drlg. salt 1,407 ft; top of salt 1,392 ft.
Mills Bennett Prod. Co.'s No. 2-C Gulf fee, Wm. Bloodgood Sur., 175 ft. N of No. 1 ..... Drlg. calcite 2,256 ft.
Sinclair Prairie Oil Co.'s No. 2 Smith (W.O.), W. D. Smith Sur., 20 ft. from N line, 50 ft. from E line of 30-ac. tract ..... Set screen 6,813 ft; swbng.
Sinclair Prairie Oil Co.'s No. 14 Wilburn, Henry Griffith League, 150 ft. W of No. 12 ..... Drlg. salt 1,564 ft.
Sun Oil Co.'s No. 15 J. Wilburn, Wm. Hodges Sur., 342 ft. from N line, 420 ft. from W line of lease ..... Drill pipe stuck 4,462 ft; sidetracked 4,301-4,462 ft.
Sun Oil Co.'s No. 16 Wilburn, Henry Griffith League, 150 ft. W of No. 14 and 50 ft. N of S line ..... Rig.
The Texas Co.'s No. 3 Lawrence fee, Henry Griffith League, 740 ft. W of E line in center of tract..... Drlg. shale and lime 4,647 ft.
The Texas Co.'s No. 9 Wilburn, Henry Griffith League, 580 ft. E of NW cor. and 50 ft. S of N line ..... Salt 2,035 ft; cmtd. cavity; D.S. stuck.
Texas Gulf Prod. Co.'s No. 12-H Kirby, Henry Griffith League, 429 ft. W of No. 8-H and 65 ft. N of S line.. Coring sand 3,891 ft.
Texas Gulf Prod. Co.'s No. 2 O. K. Winfrey, W. D. Smith Sur., 395 ft. N of SW cor. of A. E. Barber lease, 100 ft. W of E line of Winfrey lease ..... Salt 4,120-4,359 ft; abd.
Yount Lee Oil Co.'s No. 20 Chambers County, Wm. Bloodgood Sur., 150 ft. N of No. 2 and 50 ft. E of W line ..... Drlg. shale and boulders 2,749 ft.
Yount Lee Oil Co.'s No. 21 Chambers County, Wm. Bloodgood Sur., 175 ft. N of No. 20 and 50 ft. E of W line ..... Drlg. hard sandy lime 1,937 ft.
Yount Lee Oil Co.'s No. 4-A Zadie Fisher, Wm. Bloodgood Sur., 201 ft. from W line, 96 ft. from S line of tract ..... Drlg. heaving shale 6,923 ft.
Yount Lee Oil Co.'s No. 1 John Schilling, Wm. Bloodgood Sur., 50 ft. W of E line, 139.2 ft. S of N line of tract ..... Derrick.

RABBS RIDGE—FORT BEND COUNTY

Gulf Prod. Co.'s No. 2-A Gubbels, Samuel Kennedy Sur... Derrick.
Gulf Prod. Co.'s No. 1 Hammerstrom, Samuel Kennedy Sur., 467 ft. N of S line and 466 ft. E of W line of lease ..... Comp. 55 bbls. per hr.; ¾-in. choke, 5,398 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 11-A F. I. Booth, Samuel Kennedy Sur., 6,108 ft. E along N line of J. Rabb Sur., from NW cor. of E½ of survey and 467 ft. N at right angles ..... Location.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 12-A F. I. Booth, Samuel Kennedy, Sur., 898 ft. E of No. 10.. Sandy shale 5,300 ft; set screen.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 4-A George J Rabb Sur. ..... Drlg. shale and lime 3,656 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 11-A Lockwood & Sharp, J. Rabb Sur. ..... Location.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 13-A Lockwood & Sharp, J. Rabb Sur., 4,174 ft. E, 522 ft. S of NW cor. of lease ..... Drlg. shale 3,650 ft.
Humble O. & R. Co and Gulf Prod. Co.'s No. 14-A Lockwood & Sharp, J. Rabb Sur., 4,173 ft. from W line 526 ft. from S line of lease ..... Location.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 15-A Lockwood & Sharp, J. Rabb Sur. ..... Rig.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 12-B Lockwood & Sharp, J. Rabb Sur., 1,729 ft. from E line, 1,129 ft. from S line of "B" lease ..... Derrick.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 13-B Lockwood & Sharp, J. Rabb Sur., 5,382 ft. from W line, 526 ft. from S line of "B" lease ..... Derrick.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 7 Lockwood, J. Rabb Sur., 4,889 ft. from W line, 311 ft. from S line of 383-ac. tract ..... Comp. 67 bbls. per hr.; ¾-in. choke, 675 lbs. on tbg, 5,300 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 6 Meyers, Samuel Kennedy Sur., 6,596 ft. E and 433 ft. N of SW cor. of 275-ac. tract ..... Comp. 50 bbls. per hr.; 5,300 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 1 R. A. and O. H. Wolters, Robt. Peebles Sur., 325 ft. S and 500 ft. W of NE cor. of 1,000-ac. tract ..... Derrick.
Humble O. & R. Co.'s No. 4 Gubbels, Samuel Kennedy Sur., 1,400 ft. N, 2,460 ft. W of SE cor. of 100-ac. lease ..... Comp. 43 bbls. per hr.; ¾-in. choke, 5,310 ft.
Humble O. & R. Co.'s No. 5 Gubbels, Samuel Kennedy Sur., 1,460 ft. N, 1,476 ft. W of SE cor. of 100-ac. tract ..... Rig.

SUGARLAND—FORT BEND COUNTY

Kolmm Prod. Co.'s No. 1 Peterson, Wm. Littel Sur., 100 ft. SE, 100 ft. SW of NE cor. of tract ..... Sand and shale 3,756 ft; preparing to set csg.

HIGH ISLAND—GALVESTON COUNTY

Yount Lee Oil Co.'s No. 3 Broussard, M. Dunman Sur., 150 ft. E of center of W line of tract ..... Sand 5,300 ft.
Yount Lee Oil Co.'s No. 33 Cade, N. Fitzsimmons Sur., 2,505 ft. from N line, 1,615 ft. from E line ..... Drlg. sand and lime 5,000 ft.
Yount Lee Oil Co.'s No. 34 Cade, N. Fitzsimmons Sur., 856 ft. S of No. 33 ..... Drlg. sand and shale 3,720 ft.
Yount Lee Oil Co.'s No. 14 Smith, Martin Duman Sur., 900 ft. W of No. 13 ..... Drlg. shale 4,375 ft.

ARIOLA—HARDIN COUNTY

Houston Oil Co.'s No. 1-Y Ariola fee, 5,610 ft. from W line, 5,610 ft. from N line of Ariola Sur. ..... Heaving shale 5,946 ft; T.A.

SARATOGA—HARDIN COUNTY

Rio Bravo Oil Co.'s No. 93 Jordit, Jordit Sur., 200 ft. W of No. 20 ..... Derrick.

HUMBLE—HARRIS COUNTY

Sun Oil Co.'s No. 66 River, Robert Dunman Sur., 1,722 ft. from S line, 284 ft. from E line of lease ..... Location.
Sun Oil Co.'s No. 62 River, Robt. Dunman Sur., 1,471 ft. from S line, 284 ft. from W line of lease ..... Drlg. gumbo 909 ft.

MYKAWA—HARRIS COUNTY

Crown-Framer Oil Co.'s No. 4 Minntex, 165 ft. S, 120 ft. W of NE cor. of Blk. 193, Wm. Lovett Sur. ..... Drlg. shale 4,887 ft.

PIERCE JUNCTION—HARRIS COUNTY

Rio Bravo Oil Co.'s No. 14-A Settegast (W.O.), J. Kopman Sur. ..... T.D. 5,379 ft; pulling screen to W.O.
Rio Bravo Oil Co.'s No. 26-A Settegast, J. Kopman Sur., 1,210 ft. from N line, 750 ft. from E line of "A" lease ..... Sandy shale 5,750 ft; cmtd. 6⅝-in. csg. 5,714 ft; preparing to drill plug.
Saxet Oil Co.'s No. 3 Herman (W.O.), J. Kopman Sur. No. 44 ..... T.D. 3,778 ft; pulling screen to W.O.
Bryan Ward's No. 1 Mowery, 300 ft. from W line, 62 ft. from S line of J. Hamilton Sur. No. 53 ..... T.D. 1,537 ft.

FANNETT—JEFFERSON COUNTY

Lowrie & Young's No. 1 Junker, Wm. Smith Sur., 125 ft. N, 100 ft. E of Gulf Prod. Co.'s No. 1 Junker in 360-ac. tract ..... No report.

ESPERSON—LIBERTY COUNTY

Cranfill-Reynolds Co.'s No. 1 Davis (W.O.), David L. Kokernot Sur., 50 ft. from S and E lines of survey.. Drlg. sandy shale 2,950 ft.

Cranfill-Reynolds Co.'s No. 10 Moore's Bluff, M. Duncan Sur., 1,800 ft. from E line, 2,100 ft. from N line of 632-ac. tract ..... Drlg. shale 6,752 ft.

HULL—LIBERTY COUNTY

Aberoll Oil Co.'s No. 1 Barrow, Jesse Devore Sur., 64 ft. from N line, 700 ft. from E line of 10-ac. tract.. Coring sand and shale 5,850 ft.

Carpenter & Parr's No. 2 Antilley, Jesse Devore Sur., 921 ft. W., 350 ft. S of NE cor. of 10-ac. lease .. Derrick.

Eclipse Oil Co.'s No. 1 Gordon, Jesse Devore Sur., 50 ft. out of NE cor. of Empire 13-ac. lease ..... Rigging.

Hannah Oil Co.'s No. 1 Hannan, Jesse Devore Sur., 100 ft. W of The Texas Co.'s No. 1 Hannah..... Standing 3,665 ft.

Lynd & Rowe's No. 1 Noble & Lynd, Jesse Devore Sur., 187 ft. out of SE cor. of 5-ac. tract ..... Standing 3,564 ft.

Porter & Baggett's No. 1 Baggett, Jesse Devore Sur., 50 ft. from W line, 50 ft. from S line of 171-ac. tract ..... S.D. 3,071 ft.

Republic Prod. Co.'s No. 149 Dolbear, Jesse Devore Sur., 250 ft. W of No. 6 ..... Drlg. 2,350 ft.

D. L. Thibodeaux' No. 3 Tayler, Jesse Devore Sur., 100 ft. N of No. 1 ..... Derrick.

Unique Oil Co.'s No. 1 Knox-Nelson-Layton, Jesse Devore Sur., 30 ft. from N line and midway E and W of ¼-ac. tract ..... Drlg. 3,360 ft.

MARKHAM—MATAGORDA COUNTY

S. M. Hamill et al's No. 3 Meyers, Wm. Hadden Sur., 225 ft. due W of No. 1 ..... Set 24 ft. of 4¾-in. screen; comp. flowing 20 bbls. per hr.; ¼-in. choke, 3,395 ft.

CONROE—MONTGOMERY COUNTY

Alpha Oil Co.'s No. 1 T. S. Falvey, 466 ft. from S and E lines of G. Harris Sur. ..... Derrick.

Alpha Oil Co.'s No. 2 Keystone Mills, Lemuel Smith Sur., 466 ft. from S and E lines of 200-ac. tract .. Drlg. shale 4,998 ft.

Alpha Oil Co.'s No. 3 Keystone Mills, Lemuel Smith Sur., 1,200 ft. from N line, 466 ft. from W line of tract ..... Location.

Alpha Oil Co.'s No. 2-A Krohn, S. H. Bryan ..... Drlg. shale 2,156 ft.

Alpha Oil Co.'s No. 1-C South Tex. Dev. Co., T.&N.O. Sur. No. 13, 450 ft. from N line, 350 ft. from W line of 60 acres ..... T.D. 4,920 ft; standing.

Amerada Pet. Corp.'s No. 3 South Tex. Dev. Co., 909 ft. from W line, 1,005 ft. from S line of C. A. West Sur. ..... Drlg. shale 4,812 ft.

Bishop Oil Corp.'s No. 1 Rhoden, 466 ft. from E line in center N and S of 25.8-ac. tract ..... Location.

Bishop Oil Corp.'s No. 1 Rhoden, 466 ft. from W line in center N and S of 25.8-ac. tract ..... Location.

Bishop Oil Co.'s No. 1 Smith & Ratcliff, W. F. Rhoden Sur., 466 ft. out of SE cor. of lease ..... Drlg. shale 4,795 ft.

J. H. Coker's No. 1 McDonald, center Sec. 13, W.C.R.R. Sur. ..... Location.

H. M. Crighton's No. 1-A South Tex. Dev. Co., center of 16-ac. lease in T.&N.O. Sur. No. 5 ..... Location.

Faryin Oil Co.'s No. 1 R. Thompson, center of 10-ac. lease (Lots 55 and 58), C. A. West Sur. ..... Location.

Feltex Oil Co.'s No. 2 Keystone Mills, Lemuel Smith Sur., 1,041 ft. W of No. 1, in center of tract N and S.. Derrick.

Feltex Oil Co.'s No. 1 Kirby Bertrand, 466 ft. from N line of G. W. Wagers Sur. in center of lease east and west ..... Comp. dry gas well.

John Gassell's No. 1 E. A. Walker, C. T. Darby Sur., center of 12-ac. tract ..... Location.

Gulf Coast Drlg. & Prod. Co.'s No. 5 Keystone Mills, 934 ft. E of No. 3 and 467 ft. S of N line of Ashby James Sur. ..... Drlg. plug 5,096 ft.

Gulf Coast Drlg. & Prod. Co.'s No. 6 Keystone Mills, 466 ft. out of most westerly NW cor. of A. S. James Sur. ..... Derrick.

Gulf Coast Drlg. & Prod. Co.'s No. 1-A Keystone Mills, Steele Sur., 1,368 ft. from W line of lease and 552 ft. from N line of survey ..... Drlg. shale 776 ft.

Hamill & Smith's No. 1 South Tex. Dev. Co., center of 5-ac. tract in T.&N.O. Sur. No. 5 ..... Drlg. shale 1,147 ft.

Harrison & Abercrombie's No. 4 Alexander, John McHorse Sur., 356 ft. from E line, 425 ft. from S line of lease ..... Location.

Harrison & Abercrombie's No. 6 Alexander, John McHorse Sur., 466 ft. from W line, 360 ft. from S line of lease ..... Location.

Harrison & Abercrombie's No. 1 W. S. Massey, 466 ft. from S and W lines of John Massey Sur. ..... Derrick.

Harrison & Abercrombie's No. 1 Ben Wiggins, M. T. Wiggins Sur., 403 ft. from E line and 207 ft. from S line of 29-ac. tract ..... Drlg. shale 2,583 ft.

Harrison & Abercrombie's No. 1 Arthur Wiggins, 403 ft. W of E line and 207 ft. N of S line of T. M. Wiggins Sur. ..... Comp. 86 bbls. per hr.; ½-in. choke, 5,103 ft.

Hooper-Rutherford Oil Co.'s No. 5 Hooper, I.&G.N. Sur., Abst. 649, 415 ft. from S line, 570 ft. from W line of lease ..... Location.

Hooper-Rutherford Oil Co.'s No. 4 Hooper, I.&G.N. Sur., No. 649, center of tract E and W and due E offset Houston-Tidal's No. 1 Hooper ..... Drlg. shale 2,615 ft.

Houston Oil Co.-Tide Water Oil Co.'s No. 4 Cartwright, John Davis Sur., 333 ft. from E line, 799 ft. from N line of lease ..... Location.

Houston Oil Co.-Tide Water Oil Co.'s No. 5 Cartwright, John Davis Sur., 933 ft. E of No. 1 and 466 ft. from S line of lease ..... Set screen 5,172 ft; comp.

Houston Oil Co.-Tide Water Oil Co.'s No. 6 Cartwright, John Davis Sur., 932 ft. E of No. 5 and 466 ft. from S line of lease ..... Drlg. sand and boulders 649 ft.

Houston Oil Co.-Tide Water Oil Co.'s No. 5 Hamman, C. B. Stewart Sur., 466 ft. from S and E line of lease ..... Shale 995 ft; cmtd. csg.

Houston Oil Co.-Tide Water Oil Co.'s No. 3 W. N. Hooper, Jr., I.&G.N. Sur. No. 11, 667 ft. S of No. 1 in center of tract E and W ..... Derrick.

Humble O. & R. Co.'s No. 1-F Alexander, 333 ft. from E line, 586 ft. from S line of John McHorse Sur. ... Location.

Humble O. & R. Co.'s No. 8-A Cartwright, J. Davis Sur., 933 ft. NE of No. 6 ..... Location.

Humble O. & R. Co.'s No. 10-A Cartwright, John Davis Sur., 933 ft. E of No. 4 ..... Drlg. shale 4,763 ft.

Humble O. & R. Co.'s No. 2-C Cartwright, John Davis Sur., 650 ft. from S line, 300 ft. from E line of "C" lease ..... Drlg. sand and shale 5,070 ft.

Humble O. & R. Co.'s No. 3-C Cartwright, J. Davis Sur., 1,375 ft. from E line, 466 ft. from S line of lease ..... Location.

Humble O. & R. Co.'s No. 1 P. Collins, 466 ft. out of NE cor. of 75-ac. tract, Lemuel Smith Sur. ..... Drlg. lime 4,483 ft.

Humble O. & R. Co.'s No. 7 Dobbins, 452 ft. from N line, 1,514 ft. from W line of Ransom House Sur. .. Location.

Humble O. & R. Co.'s No. 8 Dobbins, Ransom House Sur., 1,084 ft. E of No. 7 ..... Location.

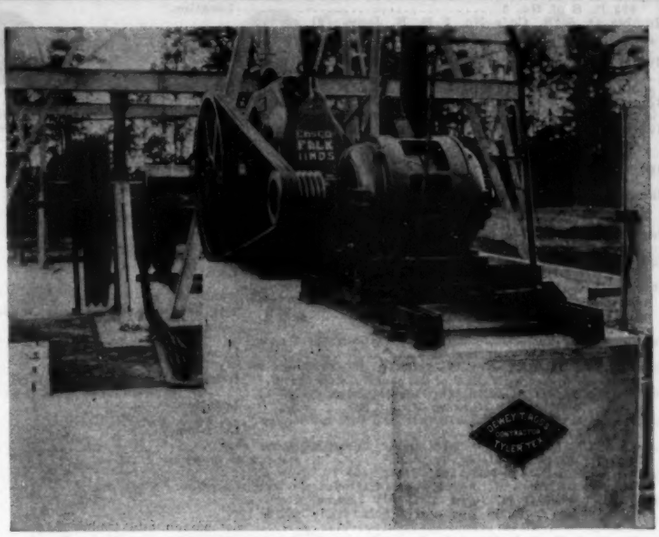
Humble O. & R. Co.'s No. 2 Emory, W.C.R.R. Sur., 2,-100 ft. from S line, 350 ft. from E line ..... Sand 5,151 ft; cmtd. csg.

Humble O. & R. Co.'s No. 3 Emory, 1,211 ft. from W line, 547 ft. from S line of W.C.R.R. Sur. No. 13.... Location.

Humble O. & R. Co.'s No. 6 Emory, W.C.C.R.R. Sur. No. 13, 496 ft. SE of No. 5 and 496 ft. NE of No. 4 .... Location.

Humble O. & R. Co.'s No. 1-B Hirsch, D. McIntyre Sur., 350 ft. from S line, 450 ft. from W line of "B" lease ..... Sand S.O. 5,092 ft.

Humble O. & R. Co.'s No. 3-B Hirsch, 1,311 ft. from W line and 647 ft. from N line of D. McIntyre Sur... Drlg. shale 4,759 ft.



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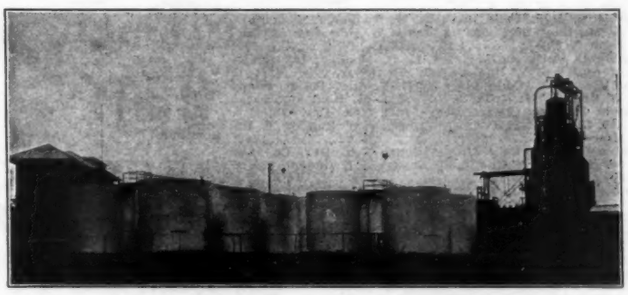

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Humble O. & R. Co.'s No. 4-B Hirsch, D. McIntyre Sur., 933 ft. S of No. 3	Location.
Humble O. & R. Co.'s No. 2 B. E. Jones (91 acres), 466 ft. from N line and 2,206 ft. from E line of Lemuel Smith	Drlg. shale 1,761 ft.
Humble O. & R. Co.'s No. 8 Madeley, Ransom House Sur., S offset Hooper Rutherford Oil Co.'s No. 8 Madeley	Drlg. hard shale 4,103 ft.
Humble O. & R. Co.'s No. 9 Madeley, 171 ft. from N line and 451 ft. from W line of Ransom House Sur.	Drlg. shale 4,507 ft.
Humble O. & R. Co.'s No. 10 Madeley, Ransom House Sur., 1,718 ft. SE of No. 6	Comp. 85 bbls. per hr.; ½-in. choke, 5,153 ft.
Humble O. & R. Co.'s No. 11 Madeley, Ransom House Sur., 1,898 ft. S of N line and 466 ft. W of E line	Drlg. shale 1,005 ft.
Humble O. & R. Co.'s No. 12 Madeley, Ransom House Sur., 500 ft. from N line and 1,310 ft. from W line of tract	Location.
Humble O & R. Co.'s No. 13 Madeley, Ransom House Sur., 1,100 ft. SE of No. 6	Location.
Humble O. & R. Co.'s No. 15 Madeley, Ransom House Sur., 978 ft. SW of No. 7	Location.
Humble O. & R. Co.'s No. 28 Madeley, Ransom House Sur., 466 ft. S of N line, west offset Standard No. 1 Madeley	T.D. 496 ft; hole cratered; moved rig off.
Humble O. & R. Co.'s No. 30 Madeley, Ransom House Sur., 1,709 ft. NW of No. 31	Location.
Humble O. & R. Co.'s No. 31 Madeley, 466 ft. from S line, 466 ft. from W line of Ransom House Sur.	Drlg. shale 976 ft.
Humble O. & R. Co.'s No. 32 Madeley, 452 ft. N of center of S line of Ransom House Sur.	Location.
Humble O. & R. Co.'s No. 33 Madeley, Ransom House Sur., 1,044 ft. E of No. 32	Location.
Humble O. & R. Co.'s No. 34 Madeley, Ransom House Sur., 1,221 ft. NE of No. 7	Drlg. shale 1,256 ft.
Humble O. & R. Co.'s No. 35 Madeley, 480 ft. from E line, 425 ft. from S line of Ransom House Sur.	Location.
Humble O. & R. Co.'s No. 2 McComb, Lemuel Smith Sur., 400 ft. from W line and 255 ft. from N line of lease	Set screen and tubing 5,140 ft.
Humble O. & R. Co.'s No. 4 L. B. McCombs, L. Smith Sur., 1,134 ft. NW, 873 ft. NE at right angles out of SW cor. of tract	Location.
Humble O. & R. Co.'s No. 4 L. B. McComb, L. Smith Sur., 1,100 ft. NW, 650 ft. NE at right angles out of SW cor. of tract	Location.
Humble O. & R. Co.'s No. 9 Moore, Lemuel Smith Sur., 933 ft. N of No. 6	Drlg. shale 1,930 ft.
Humble O. & R. Co.'s No. 10 Moore, Lemuel Smith Sur., 933 ft. N of No. 5	Drlg. gumbo 1,435 ft.
Humble O. & R. Co.'s No. 11 Moore, Lemuel Smith Sur., 933 ft. N of No. 7	Rigging.
Humble O. & R. Co.'s No. 13 Moore, Lemuel Smith Sur., 933 ft. SE of No. 4	Drlg. shale 4,965 ft.
Humble O. & R. Co.'s No. 15 Moore, Lemuel Smith Sur., 933 ft. NW of No. 7	Drlg. hard sand 3,782 ft.
Humble O. & R. Co.'s No. 16 Moore, Lemuel Smith Sur., 933 ft. SW of No. 6	Drlg. sand and shale 5,014 ft.
Humble O. & R. Co.'s No. 17 Moore, Lemuel Smith Sur., 933 ft. NW of No. 15	Location.
Humble O. & R. Co.'s No. 18 Moore, Lemuel Smith Sur., 933 ft. NW of No. 8	Location.
Humble O. & R. Co.'s No. 19 Moore, Lemuel Smith Sur., 933 ft. NW of No. 1	Location.
Humble O. & R. Co.'s No. 21 Moore, Lemuel Smith Sur., 933 ft. SW of No. 9	Location.
Humble O. & R. Co.'s No. 22 Moore, Lemuel Smith Sur., 933 ft. SW of No. 21	Location.
Humble O. & R. Co.'s No. 27 Moore, 466 ft. from S and E lines of Lemuel Smith Sur.	Rig.
Humble O. & R. Co.'s No. 2 Ezra Moorehead, 466 ft. E and 466 ft. S from most southerly NW cor. of L. A. Lang Sur.	Drlg. sand 2,955 ft.
Humble O. & R. Co.'s No. 3 Plaefflin, 980 ft. from N line, 664 ft. from W line of W. M. Real Sur.	Location.
Humble O. & R. Co.'s No. 4 Plaefflin, 658 ft. S of No. 3, W. M. Real Sur.	Location.
Humble O. & R. Co.'s No. 5 Plaefflin, W. M. Real Sur., 664 ft. S of No. 4	Location.
Humble O. & R. Co.'s No. 1 L. B. Rooker (120 acres), J. M. Real Sur., 521 ft. from W line and 466 ft. from N line	Sand 5,147 ft; cmtd. csg.
Humble O. & R. Co.'s No. 3 L. B. Rooker, 403 ft. E of center of W line of J. M. Real Sur.	Location.
Humble O. & R. Co.'s No. 4 L. B. Rooker, 466 ft. from W line, 505 ft. from S line of J. M. Real Sur.	Drlg. shale 2,596 ft.
Humble O. & R. Co.'s No. 28 South Tex. Dev. Co., 1,450 ft. from S line, 900 ft. from W line of T. C. Howell Sur.	Location.
Humble O. & R. Co.'s No. 29 South Tex. Dev. Co., 1,900 ft. from S line, 1,300 ft. from E line of T. C. Howell Sur.	Location.
Humble O. & R. Co.'s No. 32 South Tex. Dev. Co., 1,200 ft. from S line, 4,800 ft. from E line of Theo. Slade Sur.	Location.
Humble O. & R. Co.'s No. 33 South Tex. Dev. Co., 1,300 ft. from S line, 4,000 ft. from E line of Theo. Slade Sur.	Location.
Humble O. & R. Co.'s No. 34 South Tex. Dev. Co., Theo. Slade Sur., 933 ft. NE of No. 33	Location.
Humble O. & R. Co.'s No. 35 South Tex. Dev. Co., Theo. Slade Sur., 1,095 ft. NE of No. 34	Location.
Humble O. & R. Co.'s No. 36 South Tex. Dev. Co., Theo. Slade Sur., 1,010 ft. NE of No. 35	Location.
Humble O. & R. Co.'s No. 37 South Tex. Dev. Co., Theo. Slade Sur., 933 ft. NE of No. 36	Location.
Humble O. & R. Co.'s No. 41 South Tex. Dev. Co., Theo. Slade Sur., 933 ft. S of No. 24	Location.
Humble O. & R. Co.'s No. 42 South Tex. Dev. Co., Theo. Slade Sur., 1,114 ft. NE of No. 42	Drlg. shale 4,300 ft.
Humble O. & R. Co.'s No. 43 South Tex. Dev. Co., Theo. Slade Sur., 933 ft. NE of No. 31	Drlg. shale 1,800 ft.
Humble O. & R. Co.'s No. 44 South Tex. Dev. Co., 664 ft. W of center of E line of Theo. Slade Sur.	Location.
Humble O. & R. Co.'s No. 45 South Tex. Dev. Co., Theo. Slade Sur., 1,424 ft. N of No. 15	Location.
Humble O. & R. Co.'s No. 46 South Tex. Dev. Co., Theo. Slade Sur., 760 ft. NE of No. 15	Location.
Humble O. & R. Co.'s No. 5-B South Tex. Dev. Co., 339 ft. from E line and 466 ft. from S line of C. T. Darby Sur.	Sand 5,140 ft; cmtd. csg.
Humble O. & R. Co.'s No. 2 Mrs. L. Wiggins, Lemuel Smith Sur., 577 ft. from N line and 376 ft. from E line of tract	Drlg. sand 3,839 ft.
Humble O. & R. Co.'s No. 2 Williams, Lemuel Smith Sur., 253 ft. from N line and 400 ft. from W line of 46-ac. tract	Drlg. shale 1,228 ft.
Humble O. & R. Co.'s No. 3 Williams, Lemuel Smith Sur., 466 ft. W of E line in center of 46-ac. tract N and S	Sand and shale 5,032 ft; cmtd. csg.
McAlbert Oil Co.'s No. 1 Keystone Mills, A. Steele Sur., 433½ ft. S of N line of lease in center of tract E and W	Drlg. sand 1,795 ft.
J. R. Mosker's No. 1 Fannie Hooper, J. W. Watson Sur., center of 20-ac. tract	Drlg. shale 3,250 ft.
Mortex Oil Co.'s No. 1 South Tex. Dev. Co., T.&N.O. Sur. No. 13, 350 ft. from W line, 150 ft. from N line of tract	Drlg. shale 2,166 ft.
M. J. Munn's No. 1 South Tex. Dev. Co., 150 ft. from E line, 140 ft. from S line of Lot 114, Clark Beach Sur.	Circulating 5,050 ft.
Neuhaus & Horn's No. 1 South Tex. Dev. Co., center of L. L. Horn 16.31-ac. tract in T.&N.O. Sur. No. 5	Derrick.
Neversuch Oil Co.'s No. 2 South Tex. Dev. Co., T.&N.O. Sur. No. 5, 922 ft. N of No. 1, in center of tract E and W	S.D. 1,820 ft.
North Star Oil Co.'s No. 1 Crestwood, T.&N.O. Sur. 15, 466 ft. from S and W line of 77-ac. tract	Location.
Republic Prod. Co.'s No. 1 B. D. Griffin, Wilson Strickland Sur., 283 ft. from E line, 466 ft. from N line of lease	Derrick.
Showers & Moncrief's No. 2 Dunn, Wilson Strickland Sur., 990 ft. S of No. 3	Drlg. shale 3,446 ft.
Showers & Moncrief's No. 3 Dunn, Wilson Strickland Sur., 990 ft. S of No. 1	Drlg. rock 945 ft.
Skelly Oil Co.-Conroe Oil Co.'s No. 2 South Tex. Dev. Co., T.&N.O. Sur. No. 5, 467 ft. from N line of 32-ac. tract in center E and W	Drlg. shale 1,623 ft.
Southern Drlg. Co.'s No. 1 South Tex. Dev. Co., T.&N. O. Sur. No. 5, center of 5-ac. tract	Drlg. sand and shale 2,081 ft.
South Gulf Oil Co.'s No. 1 E. M. Rauh, T.&N.O. Sur. 5, 338 ft. from E line of 20-ac. lease in center of N and S	Drlg. shale 5,121 ft.
Southland Oil Co.'s No. 4 Cummings, Wilson Strickland Sur.	Drlg. shale 4,023 ft.
Southland Oil Co.'s No. 5 Cummings, Wilson Strickland Sur., 766 ft. from E line, 284 ft. from S line of lease	Rig.
Standard Oil Co. of Kans.' No. 1-A Madeley, Ransom House, 601 ft. from N line, 237 ft. from W line of lease	Spudded.
Standard Oil Co. of Kansas' No. 2 Madeley, Ransom House Sur., 925 ft. S of No. 1	T.D. 1,200 ft; blew out and cratered; burning.
Standard Oil Co. of Kans.' No. 3 Madeley, Ransom House Sur., 480 ft. from E line and 466 ft. from S line of lease	Drlg. shale 1,458 ft.
Standard Oil Co. of Kansas' No. 3 Smith & Ratcliffe, lower W. S. Rhodes Sur., 207 ft. from N line, 403 ft. from E line	Sand and shale 5,123 ft.
Standard Oil Co. of Kans.' No. 3 Smith & Ratcliff, W. S. Rhodes Sur., 466 ft. from N and W lines of lease	Derrick.
Standard Oil Co. of Kans.' No. 4 Smith & Ratcliffe, W. S. Rhodes Sur., 503 ft. along E line of Rhodes Sur. from SW cor. of Humble's Rooker lease and west 466 ft. at right angles	Cmtd. csg. 1,423 ft.
Standard Oil Co. of Kans.' No. 5 Smith & Ratcliffe, W. S. Rhodes Sur., 466 ft. out of SW cor. of lease	Drlg. shale 2,545 ft.
Steinberger, Brown & Wheeler's No. 2 South Tex. Dev. Co., T.&N.O. Sur. No. 5, 450 ft. from S line in center E and W of 20-ac. tract in 40-ac. lease	Drlg. shale 1,225 ft.
Steinberger, Brown & Wheeler's No. 3 South Tex. Dev. Co., T.&N.O. Sur. No. 5, center of NE 10 acres of 50-ac. tract	Derrick.
Strake Pet., Inc.'s No. 1 Etheridge, S. H. Bryan, 466 ft. from N and E lines of lease	Location.
Strake Pet., Inc.'s No. 1 Keystone Mills, Lemuel Smith Sur., 1,200 ft. southward along W line of Alpha 200-ac. lease from NW cor. and 466 ft. W at right angles	T.D. 5,120 ft.; comp. 80 bbls. of fluid, 91% oil, ⅛-in. choke; killed well to plug back.
Strake Pet., Inc.'s No. 1 Elisabeth Moody, C. B. Stewart Sur., 1,400 ft. from S line and 467 ft. from E line of 726-ac. tract	Drlg. shale 4,802 ft.
Sun Oil Co.'s No. 1 Keystone Mills, 466 ft. from N and E lines of John Bricker Sur.	Drlg. shale 4,304 ft.
Sun Oil Co.'s No. 1 South Tex. Dev. Co., T.&N.O. Sur., No. 5, 467 ft. from S line in center E and W of 80-ac. tract	Rig.
Sun Oil Co.'s No. 2 South Tex. Dev. Co., T.&N.O. Sur. No. 5, 942 ft. N of No. 1 in center of lease E and W	Location.
Sun Oil Co.'s No. 1 W. S. Stewart, 466 ft. from S and E lines of J. M. Real Sur.	Drlg. shale 4,901 ft.
Sun Oil Co.'s No. 2 Stewart, J. M. Real Sur., 1,040 ft. from E line, 700 ft. from N line of lease	Derrick.
The Texas Co.'s No. 2 Dudley, C. B. Stewart Sur., 466 ft. from S and E lines of lease	Shale 1,384 ft; cmtd. 10¾-in. csg. 1,380 ft.
The Texas Co.'s No. 7 Moody, Ransom House Sur., 1,306 ft. from N line and 466 ft. from E line of lease	T.D. 5,027 ft; comp. 42 bbls. per hr.; 7/16-in. choke.
The Texas Co.'s No. 10 Moody, 3,030 ft. from E line, 600 ft. from S line of Ransom House Sur.	Location.
The Texas Co.'s No. 12 Moody, Ransom House Sur., 932 ft. S of No. 8	Location.
The Texas Co.'s No. 13 Moody, 2,136 ft. from E line, 466 ft. from S line of Ransom House Sur.	Drlg. gumbo 2,672 ft.
The Texas Co.'s No. 15 Moody, Ransom House Sur., 966 ft. N of No. 14	Location.
The Texas Co.'s No. 16 Moody, 1,383 ft. SW along S line of Wilson Strickland Sur. from SE cor. and 466 ft. S at right angles in Ransom House Sur.	T.D. 5,020 ft; cmtd. 7-in. csg.
The Texas Co.'s No. 18 Moody, N 60 deg. E 2,919 ft. and N 30 deg. W 253 ft. from SW cor. Ransom House Sur.	Drlg. sticky shale 3,560 ft.
The Texas Co.'s No. 19 Moody, 1,682 ft. NE along SE line of Ransom House Sur. from SW cor. and 466 ft. NW at right angles	Drlg. sticky shale and shell 1,765 ft.
The Texas Co.'s No. 20 Moody, 2,200 ft. E along S line of Wilson Strickland Subd. from SW cor. and 466 ft. S at right angles	Location.
The Texas Co.'s No. 2 Rhodes, 979 ft. 15 deg. W, 466 ft. N 75 deg. E of SW cor. of W. S. Rhodes Sur.	Derrick.
The Texas Co.'s No. 5 W. S. Rhodes, 466 ft. S of SW cor. of C. T. Darby Sur., and 350 ft. at right angles in W. S. Rhodes Sur.	Drlg. gumbo 1,206 ft.
The Texas Co.'s No. 6 Rhodes, 2,090 ft. W of E line of lease and 466 ft. S of S line of C. A. West Sur. in W. S. Rhodes Sur.	Comp. 89 bbls. per hr.; ½-in. choke, 5,112 ft.
The Texas Co.'s No. 7 Rhodes, 1,210 ft. from E line of lease and 330 ft. S of S line of C. A. West Sur. in W. S. Rhodes Sur.	Location.
The Texas Co.'s No. 8 Rhodes, 330 ft. S of S line of C. A. West Sur., and 330 ft. W of W line of John Massey Sur. in W. S. Rhodes Sur.	Location.
The Texas Co.'s No. 9 Rhodes, W. R. Rhodes Sur., 1,290 ft. from N line and 466 ft. from E line	Rig.
The Texas Co.'s No. 10 Rhodes, 466 ft. W, 466 ft. N of SE cor. of W. S. Rhodes Sur.	Coring sand showing oil 5,136 ft.
The Texas Co.'s No. 11 Rhodes, 466 ft. from S line, 1,398 ft. from E line of W. S. Rhodes Sur.	Derrick.
Harvey Thornton's No. 1 John Rhodes, Ransom House Sur., center of 3.29-ac. tract	Cmtd. surface csg. 1,297 ft; standing.
Tide Water Oil Co.-Strake's No. 1 Dean, W. C. C. Lynch Sur., 370 ft. S of N line of survey and 2,489 ft. from W line of lease	Drlg. shale 3,220 ft.
Tide Water Oil Co.-Strake's No. 2 Dean, W. C. C. Lynch Sur., 2,351 ft. S along W line of survey from SW cor. of E. P. Brown Sur. and thence 467 ft. E at right angles	Drlg. shale 2,585 ft.
Tide Water Oil Co.-Strake's No. 3 Dean, W. C. C. Lynch Sur., 467 ft. from W line, 1,540 ft. from N line of lease	Drlg. shale 212 ft.
Tide Water Oil Co.'s No. 2 Freeman, John Davis Sur., 1,384 ft. from S line, 332 ft. from W line of 36 acres	Drlg. shale 4,616 ft.

Tide Water Oil Co.'s No. 1 J. R. Eichletz, Lemuel Smith Sur., 2,147 ft. from E line and 225 ft. from S line of 100-ac. tract ..... Derrick.
Tide Water Oil Co.'s No. 2 J. R. Eichletz, Lemuel Smith Sur., 310 ft. from E line and 596 ft. from S line of 100-ac. tract ..... Location.
Tide Water Oil Co.'s No. 1 P. G. Krohn, S. H. Bryan Sur., 467 ft. from N and E lines of lease ..... Drlg. sand and clay 260 ft.
Tide Water Oil Co.'s No. 2 P. G. Krohn, S. H. Bryan Sur., 2,150 ft. from N line, 467 ft. from E line of lease ..... Spudded.
Tide Water Oil Co.'s No. 12 Lewis, 1,584 ft. from E line, 467 ft. from N line of lease, C. B. Stewart Sur.. Sand and shale 5,097 ft; cmtd. csg.
Tide Water Oil Co.'s No. 13 Lewis, C. B. Stewart Sur., 2,175 ft. from N line and 467 ft. from E line of lease Drlg. shale 2,675 ft.
Tide Water Oil Co.'s No. 14 Lewis, C. B. Stewart Sur., 2,583 ft. from N line and 467 ft. from E line of lease. Derrick.
Tide Water Oil Co.'s No. 15 Lewis, C. B. Stewart Sur., 2,761 ft. from N line and 467 ft. from W line of lease Drlg. shale 3,832 ft.
Tide Water Oil Co.'s No. 16 Lewis, C. B. Stewart Sur., 467 ft. from S and W lines of lease ..... Rig.
Tide Water Oil Co.'s No. 17 Lewis, C. B. Stewart Sur., 1,570 ft. from W line, 467 ft. from S line of lease.. Location.
Tide Water Oil Co.-Republic Prod. Co.'s No. 3 South Tex. Dev. Co., T.&N.O. Sur. 15, 350 ft. from E line, 466 ft. from N line of lease ..... Drlg. shale 2,163 ft.
Tide Water Oil Co.-Republic Prod. Co.'s No. 4 South Tex. Dev. Co., 467 ft. from N line, 467 ft. from W line of T.&N.O. Sur. No. 5 ..... Drlg. shale 976 ft.
Tide Water Oil Co.-Republic Prod. Co.'s No. 5 South Tex. Dev. Co., T.&N.O. Sur. No. 5, 1,459 ft. from W line and 467 ft. from N line of lease..... Location.

PORT NECHES—ORANGE COUNTY

The Texas Co.'s No. 4 Stark, 675 ft. E. 340 ft. N of SW cor. Marshall Beauchamp Sur. ..... Drlg. sticky shale 3,800 ft.

CLAY CREEK—WASHINGTON COUNTY

Clay Creek Oil Co.'s No. 2 Bimage, J. F. Perry Sur., 1,400 ft. from S line, 150 ft. from E line of survey.. S.D. 1,354 ft; waiting heavier rig
Sun Oil Co.'s No. 6 Clay, J. F. Perry Sur., 300 ft. N of No. 5 ..... Losing returns 1,404 ft.

REFUGIO—REFUGIO COUNTY

Ed Jones' No. 4 Mitchell, Town tract, 900 ft. S of No. 1-B Mitchell ..... Shale 6,391 ft; setting csg.

SOUTH LOUISIANA FIELDS

JENNINGS—ACADIA PARISH

Olympic Oil Co.'s No. 1 Luckett, 1,150 ft. S, 75 ft. W of NE cor. Sec. 42-9s-2w ..... S.D. 2,122 ft.
Yount Lee Oil Co.'s No. 11 Housierre-Latrielle, 1,010 ft. N, 5,050 ft. S of SW cor. Sec. 47-9s-2w ..... Abd. in shale 8,550 ft.

DARROW—ASCENSION PARISH

Rio Bravo Oil Co.'s No. 2 Community, Sec. 31-10s-2e, 1,760 ft. S, 400 ft. W of No. 1 ..... Coring sand 4,235 ft.
Rio Bravo Oil Co.'s No. 1 Gumbel, 4,000 ft. W, 250 ft. S of NE cor. of S. Gumbel & Co. tract, Sec. 33-10s-2e.. T.D. 4,996 ft; cmtd. 9⅝-in. csg. 4,930 ft.

SORRENTO—ASCENSION PARISH

Union Sulphur Co.'s No. 23 United Land Co., Sec. 15-10s-4e, 200 ft. N and 90 ft. W of No. 2 ..... Drlg. shale 1,955 ft.

IOWA—CALCASIEU AND JEFF DAVIS PARISHES

Magnolia Pet. Co.'s No. 3 Waite, 330 ft. out of NE cor. SE Sec. 12-9s-7w ..... Drlg. sandy shale 3,564 ft.
Shell Pet. Corp.'s No. 3 Fontenot, Sec. 7-9s-6w, direct E offset Magnolia's No. 2 Waite ..... Coring sand showing oil 6,975 ft.
Shell Pet. Corp.'s No. 2 Heyd, 265 ft. N, 330 ft. W of SE cor. NE Sec. 13-9s-7w ..... Gumbo 1,215 ft.; cmtd. 13⅜-in. csg.
Shell Pet. Corp.'s No. 1 Stafford, 825 ft. S, 225 ft. E of NW cor. Sec. 18-9s-6w ..... Drlg. dry sand 4,940 ft.

EDGERLY—CALCASIEU PARISH

C. O. Noble, tr.'s No. 6 Hunter (W.O.), Sec. 21-9s-11w.. Pulling screen to deepen 3,590 ft.

LOCKPORT—CALCASIEU PARISH

Lockport Oil Co.'s No. 1 Phoenix ..... D.S. stuck 1,200 ft; standing.
Magnolia Pet. Co.'s No. 10 Bordages, Sec. 3-10s-9w, 1,001 ft. E, 338 ft. N of SW cor. of lease ..... Set 1 joint screen 6,478 ft; comp. 800 bbls. P.L. oil; ⅝-in. choke, 725 lbs.
Magnolia Pet. Co.'s No. 9 Faquahar, 200 ft. N, 150 ft. E of SW cor. NE SE Sec. 3-10s-9w ..... Sand 4,859-64 ft.; cmtd. 9⅝-in. csg.
Magnolia Pet. Co.'s No. 33 Miller, Sec. 9-10s-9w, 200 ft. S and 635 ft. E of NW cor. of lease ..... Spudded.
Union Sulphur Co.'s No. 5 Martha Moss, Sec. 8-10s-9w (location to come) ..... Location.

STARKS—CALCASIEU PARISH

Union Sulphur Co.'s No. 1 Lutcher-Moore, 2,200 ft. W, 1,010 ft. N of SE cor. Sec. 10-9s-12w ..... Derrick.

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 771 fee (D.D.), 431 ft. S and 340 ft. W of center of Sec. 29-9s-10w ..... Tested S.W. 5,156 ft; pulling screen.
Union Sulphur Co.'s No. 777 fee, 753 ft. E and 756 ft. N of center Sec. 29-9s-10w ..... Drlg. shale and lime 2,205 ft.
Union Sulphur Co.'s No. 778 fee, 362 ft. N, 1,755 ft. W of center Sec. 29-9s-10w ..... Drlg. shale and lime 2,500 ft.

VINTON—CALCASIEU PARISH

Vinton Pet. Co.'s No. 22 Vincent, 685 ft. N, 620 ft. E of SW cor. Sec. 34-10s-12w, in Lot 116 ..... Cored sand showing oil 2,650 ft.
Wilson-Broach's No. 9 Wilson, Sec. 33-10s-12w, 200 ft. N of No. 8 and 28 ft. E of W line of Strip 7 ..... Temp. S.D. 4,262 ft.

QUEYDAN—VERMILLION PARISH

Pure Oil Co.'s No. 2 Mulvey, Sec. 34-11s-1w, 1,515 ft. from N line, 1,150 ft. from E line of tract ..... Coring soft, coarse sand showing oil 4,574 ft.
Pure Oil Co.'s No. 3 Mulvey, 600 ft. S, 2,369 ft. E of NW cor. Sec. 34-11s-1w ..... Location.

HACKBERRY—CAMERON PARISH

Calcasieu Oil Co.'s No. 1 Hanszen, 300 ft. W and 30 ft. N of SE cor. SW SE Sec. 11-12s-10w ..... Drlg. 4,820 ft.
Calcasieu Oil Co.'s No. 40 Watkins, Sec. 24-12s-10w, 262 ft. S of No. 36 ..... Drlg. 3,205 ft.
Wilfred Lahaye's No. 1 Olevia, Sec. 36-12s-10w, in 2-ac. tract ..... Spudded and S.D.; to drop from report.
Jim Oil Co.'s No. 11 Irwin, Sec. 13-12s-10w, 500 ft. N, 75 ft. W of No. 4 ..... No report.
Lackawanna Oil Co.'s No. 1 Ellender, 320 ft. S, 150 ft. E of NW cor. SE SE Sec. 21-12s-10w ..... Derrick standing; to drop from report.
Massert & Cruse's No. 1 J. B. Duhon, 656 ft. S, 325 ft. E of NW cor. Sec. 26-12s-10w ..... Derrick standing; to drop from report.
The Texas Co.'s No. 10-B State, 1,000 ft. E, 200 ft. N of NE cor. Sec. 13-12s-10w ..... Rock 5,050 ft.
The Texas Co.'s No. 11-B State, 1,000 ft. E, 600 ft. N of NE cor. Sec. 13-12s-10w ..... Location.
Yount Lee Oil Co.'s No. 13 School Land, Sec. 15-12s-10w, 200 ft. S of No. 11 ..... Salt 4,694 ft; abd.
Yount Lee Oil Co.'s No. 13 School land, Sec. 16-12s-10w, 100 ft. N, 100 ft. W of No. 10 ..... Rigging up.

PORT BARRE—ST. LANDRY PARISH

The Texas Co.'s No. 13 Botney Bay, Sec. 4-6s-5e, 185 ft. W of E line of lease and direct offset Gulf's No. 3 Wilson-Cockran ..... Comp. 1,000 bbls. P.L. oil, 3,437 ft.; flowed only 20 hrs.
The Texas Co.'s No. 14 Botney Bay, Sec. 4-6s-5e, 274 ft. W of most southerly NE cor. of 562-ac. tract.. Derrick.

CHOCTAW—IBERVILLE PARISH

Standard Oil Co.'s No. 3 Gay, 520 ft. S, 200 ft. E of center Sec. 53-9s-11e ..... Drlg. 4,200 ft.

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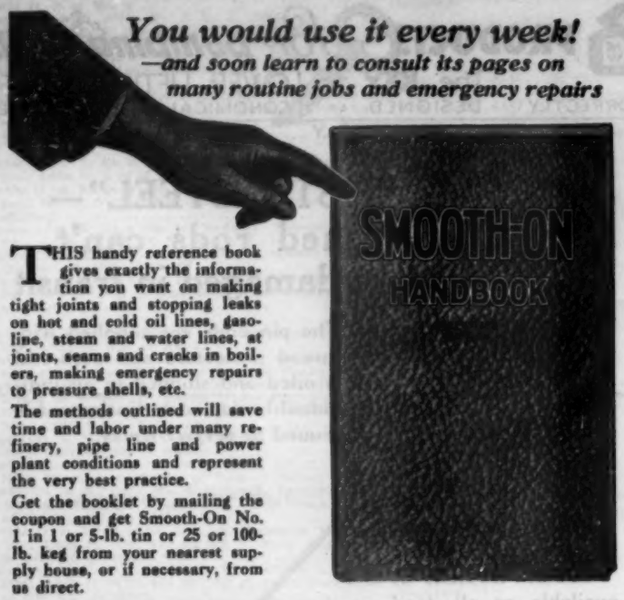

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BARGAINS ON PAGE 103

WHITE CASTLE—IBERVILLE PARISH

Shell Pet. Corp.'s No. 6 Wilbert, 1,053 ft. N, 153 ft. W, out of SE cor. Lot 2, Sec. 9-11s-12e .....Drlg. salt 6,828 ft.

CAMERON MEADOWS—CAMERON PARISH

Magnolia Pet. Co.'s No. 3 Cameron Meadows, 3,630 ft. S, 1,980 ft. W of NE cor. Sec. 21-14s-12w.....Coring sandy shale 5,283 ft.

SWEET LAKE—CAMERON PARISH

Pure Oil Co.'s No. 11 Yount Lee, Sec. 12-13s-8w, 800 ft. S 66 deg. 43 min. from No. 9 .....Drlg. sandy shale and lime 4,863 ft.

TEXAS

MISCELLANEOUS WILDCATS

AUSTIN COUNTY

Cranfill-Reynolds Co.'s No. 1 J. B. Lewis, 3,150 ft. from N line, 330 ft. from W line of J. C. Hacienda Sur.....Cmtd. 12¼-in. 129 ft.

Great Southern Oil Co.'s No. 1 Schevojas, 329 ft. N, 78 deg. E of N cor. B. Dottery Sur. .....S.D. 3,430 ft.

BRAZORIA COUNTY

Amerada Pet. Corp. and Rycade Oil Corp.'s No. 3 Seaburn, 1,250 ft. E of W line and 4,550 ft. S of N line of Austin & Williams Sur. .....Drlg. sandy shale 1,803 ft.

Danciger O. & R. Co.'s No. 2 Hunt, Pledger, 6,550 ft. from E line, 5,550 ft. from S line of W. Carson Sur.. Location.

Tri-fin Oil Co.'s No. 1 Moers, 1,635 ft. SW of Chocolate Bayou, 693 ft. SE of NW line of F. Moore Sur .....Drlg. gumbo and lime 3,330 ft.

BURLESON COUNTY

Ball & Knob's No. 1 Polansky, M. B. Lawrence Sur., 350 ft. from E line, 469 ft. from N line of 163-ac. tract .....No report.

Sampson O. & G. Co.'s No. 3 Duckworth & Gilley, P. Singleton Sur., 50 ft. SE of No. 1 .....No report.

J. E. Stubblefield et al's No. 1 Mitchell, A. T. Woolridge Sur., 81 ft. SW, 4,340 ft. SE of S cor. of Joseph Henson Sur. .....Gumbo 600 ft; standing.

CHAMBERS COUNTY

Weaver-Ray's No. 1 Fisher, John Tjams Sur., 210 ft. S of Rucker et al's No. 1 Fisher .....S.D. 2,400 ft.

COLORADO COUNTY

Danciger O. & G. Co. and L. E. Hults' No. 1 C. L. Raver, B.B.B.&C. Sur., Sec. 1, 990 ft. out of SW cor. of 477-ac. tract .....Derrick.

Fabrigus & Poole's No. 1 Lake Side Irrigation, 1,500 ft. SE, 500 ft. NE of NW cor. of Patrick Reel Sur...Rig.

Humble O. & R. Co.'s No. 1 John McShane, I.&G.N. Sur., Sec. 42, 466 ft. out of NE cor of tract .....Drlg. shale 2,983 ft.

Pilot Oil Co.'s No. 1 Tate, Cooke & DeWeese Sur., 150 ft NE, 58 ft. NW of S cor. of survey .....S.D. 1,540 ft.

Plymouth Oil Co.'s No. 1 Ream, 330 ft. out of NE cor. of I.&G.N. Sur. No. 47 .....Derrick.

FORT BEND COUNTY

John Deering and Benedum & Trees' No. 1 Westenfeld, 990 ft. E of W line, 310 ft. N of S line of M. Escalera Sur. .....S.D. 6,225 ft.

Lowrie & Young's No. 1 Jackson Brown, Pilant Lake, Wm. Barrett & Abner Harris Sur., 152 ft. E, 158 ft. N out of SE cor. Humble 182-ac. Brown lease in D. Hale 548-ac. tract .....Drlg. sandy shale 5,450 ft.

Lynch et al's No. 1 Knelts, 690 ft. from NW line, 350 ft. from SW line of Sec. 48, H.&T.C. Sur. .....No report.

Naylor & DeCosta's No. 1 Naylor, 4,350 ft. N, 55 deg. E from SW cor. 663-ac. tract in Christman Sur. ....T.D. 7,014 ft; standing.

GALVESTON COUNTY

Humble O. & R. Co.'s No. 1 Rosenkrans, Green's Bayou, center N½ of Lot 10, Sarah White Sur. .....Heaving shale 7,101 ft.

GRIMES COUNTY

Barnett et al's No. 1 Dodd, Timothy Jones Sur. .....Standing 2,689 ft.

W. J. Brightwell's No. 1 Combs, Samuel Beauman Sur., 850 ft. from S line, 622 ft. E of extreme W line of 276-ac. tract .....Drlg. sandy shale 5,270 ft.

Terrell & Clay's No. 1 D. M. Howard, T. Jones Sur., 450 ft. from E line, 750 ft. from S line of lease .....Location.

HARDIN COUNTY

Joe E. Proctor's No. 1 Russell & Teague, 2,650 ft. E, 2,777 ft. N of NW cor. of Wm. W. Young Sur. .....Standing 2,685 ft.

HARRIS COUNTY

Mills Bennett Prod. Co.'s No. 1 G. H. Klepple, March Sur., 400 ft. from N line, 330 ft. from W line of 84-ac. tract and survey .....Drlg. shale 5,148 ft.

John Deering et al's No. 2 Warren, T. Snell Sur., 100 ft. SW of No. 1 .....Set 22 ft. of 4½-in. screen 3,421 ft.; comp. 350 bbls. dly.; ¾-in choke, 20 lbs. pressure.

Weatherall Prod. Co.'s No. 1 Paven, 1,320 ft. from N line, 1,320 ft. from W line of Brock Sur. .....Location.

JASPER COUNTY

Smitherman, Neilson & Noble's No. 1 Cameron, Wm. Jones Sur., 400 ft. S 45 deg. W of SW cor. of J. W. Allen 300-ac. tract .....Shale 3,416 ft.

JEFFERSON COUNTY

Carroll & Miller's No. 1 C. A. Mashman, W. B. Dyches Sur., 462 ft. W of highway and 105 ft. S of NE line of 12-ac. tract .....Spudded and S.D.

Coastal Oil Co.'s No. 1 Young, 350 ft. from E line, 160 ft. from S line of 40-ac. tract in Blk. F-5, Lot 6, Joseph Grigsby Sur. .....Drlg. shale 3,390 ft.

Jack Schultz' No. 3 Todd, Cheek, 1,800 ft. S of No. 1 and 130 ft. E of W line of Wm. Carr Sur. .....Shale 7,000 ft; S.D. to change rigs.

LIBERTY COUNTY

James Papadakis' No. 1 Eicke, Reason Green Sur., 300 ft. from W line of 300-ac. tract in center N and S...Spudded and S.D.

MADISON COUNTY

G. C. Foster's No. 1 Poteet, J. S. Hunter Sur., 350 ft. from most southerly N line, 150 ft. from most westerly W line of 287⅛-ac. tract .....Cmtd. 10-in. csg. 150 ft.

MATAGORDA COUNTY

Cockburn Oil Corp.'s No. 5 Hawkins, Shepherds Mott, 2,200 ft. SE, 1,800 ft. NE of W cor. Daniel McCarthy Sur. .....T.D. 5,320 ft; drill pipe stuck; plugged back to 2,150 ft.

E. E. Comb's No. 1 Wadsworth, 3,350 ft. from S line, 2,750 ft. from W line of upper S. R. Fisher Sur. ....S.D. 1,100 ft.; moved part of rig and boilers to Cockburn Oil Corp.'s No. 5 Hawkins.

Dr. Griffith et al's No. 2 Baer, Big Hill, 5,000 ft. N, 3,000 ft. E from SW cor. of Seth Ingram Sur. .....Standing 2,720 ft.

R. L. Sprinkle et al's No. 1 Turner, 4,900 ft. from NE line, 2,800 ft. from SE line of M. Cummings Sur. ...Rig.

United North & South Dev. Co.'s No. 1 Stoddard (W.O.), 150 ft. W, 545 ft. N of SE cor. of Blk. 53, Buckeye townsite .....T.D. 7,926 ft; to sidetrack.

United North & South Dev. Co.'s No. 2 Stoddard, 25 ft. each way out of NW cor. of Lot 13, Buckeye Townsite .....Standing partly rigged up.

United North & South Dev. Co.'s No. 1 St. L. & B. M. "Y," 300 ft. S of main line of RR and 200 ft. NE of SW fork of "Y" in townsite, J. C. Keller Sur. ...Cored sandy shale S.O. 7,792-7,801 ft.; cmtd. 7-in. csg. 7,755 ft.

MONTGOMERY COUNTY

C. J. Daniels' No. 1 A. H. Salls, Wm. Barker Sur., 390 ft. from E line, 400 ft. from N line of W 36 acres of Salls tract .....S.D. 1,630 ft.

Mound Creek Oil Co.'s No. 1 Sealey, 2,751 ft. E and 5,033 ft. N, from SW cor. of M. Cartwright Sur. in John Sealey Sur. .....Drlg. shale 4,010 ft.

A. H. Parsons et al's No. 2 Drought, Kronknite Sur., 3,000 ft. N, 100 ft. E of NW cor. of A. B. Hill 44¼ acres .....S.D. 3,900 ft.

R. L. Sprinkle's No. 1 Rohlfs, 500 ft. out of SW cor. of H. Proneus Sur. .....Abd. in shale 5,106 ft.

Sutton-Hawkins' No. 1 Foster, Hosea de la Garza Sur., 3,333 ft. N, 1,320 ft. E of NE cor. of W. J. Johnson 100-ac. tract ..... S.D. 4,287 ft.

NEWTON COUNTY

L. A. James et al's No. 1 Price, T.&N.O. Sur., 1,000 ft. from W line, 800 ft. from N line of tract ..... Standing 2,240 ft.

POLK COUNTY

Anderson et al's No. 1 Duke, Peter J. Menard Sur., 320 ft. out of NW cor. of 225-ac. tract ..... Drlg. shale 4,225 ft.

Harrison & Abercrombie's No. 1 Carter (588-ac. lease), N 60 deg. E 1,151 ft. and N 50 deg. 145 ft. out of NW cor. of John Sweeney Sur. ..... Drlg. shale 5,075 ft.

Koch & Stevens' No. 1 Ruth Lawrence, Castallian Sur., 300 ft. from W line, 700 ft. from S line of 54-ac. tract ..... S.D. 2,653 ft.

Sazie Oil Co.'s No. 1 Reed, A. Viesca Sur., 150 ft. out of NW cor. of 479-ac. lease ..... Rig.

Toner & Purdy's No. 1 Martha Roberts, Joaquin T. De Rumayor Sur. ..... S.D. 5,060 ft.

REFUGIO COUNTY

Gulf Prod. Co.'s No. 2 J. O'Connor (W.O.), C.E.P.I.&M. Co. Sur. No. 48, 1,300 varas from S line, 1,500 varas from E line of tract ..... Drlg. shale 6,522 ft.

Gulf Prod. Co.'s No. 3 O'Connor, C.E.P.I.&M. Co. Sur., No. 133, 6,235 ft. SW along SE line from NE cor. of John O'Connor land, thence 2,639 ft. NW at right angles ..... Derrick.

Humble O. & R. Co.'s No. 3 O'Connor, Florentine Rice Sur., 13,757 ft. from S line at right angles, 3,412 ft. from E line at right angles of 5,545-ac. ranch ..... Drlg. wtr. sand 6,464 ft.

Geo. M. Smith's No. 1 J. M. O'Brien, 450 ft. W of center of E line of Winfield Sur. ..... Rig.

SAN JACINTO COUNTY

Weaver et al's No. 1 Delta Land & Timber Co., 1,400 ft. NE of SW line of James W. Robertson Sur., and 800 ft. at right angles ..... No report.

TRINITY COUNTY

C. M. Beckner's No. 1 Gibson, Wm. Beasley Sur., 600 ft. S along E line of survey and 150 ft. W at right angles ..... T.D. 1,192 ft; plugged to 999 ft.

TYLER COUNTY

Republic Prod. Co. and Houston Oil Co.'s No. 1 Sam Jeffcoat, E. Thompson Sur., 467 ft. N and E from SW cor. of 100-ac. tract ..... Derrick.

Republic Prod. Co. and Houston Oil Co.'s No. 1017-E Kirby, E. Thompson Sur., 467 ft. N and E from NE cor. of Sam Jeffcoat 100 acres ..... Drlg. shale 3,535 ft.

Republic Prod. Co. and Houston Oil Co.'s No. 1016-E Kirby, E. Thompson Sur., 467 ft. out of SE cor. of 128-ac. tract ..... Rig.

VICTORIA COUNTY

Gulf Prod. Co.'s No. 3 Keeran Ranch, Martin DeLeon Sur., 1,320 ft. NW of No. 1 ..... Drlg. sticky shale 6,965 ft.

Stoneleigh O. & G. Co.'s No. 1 E. B. Terrell, SW cor. R. Manchola Sur. No. 3 ..... Location.

The Texas Co.'s No. 4 McFaddin, 5,600 ft. S 15 deg. W and 450 ft. N 75 deg. W from E or NE cor. of Andrew J. Gary Sur. ..... Gumbo 1,164 ft.; cmtd. 13⅜-in. csg. 1,159 ft.

Quintana Oil Co.'s No. 1 McCormic, 500 ft. from SW line, 500 ft. from NW line of S.A.&M.G. Sur., Sec. 3, in most westerly NW cor. ..... Shale 5,485 ft; cmtd. 9⅝-in. 5,360 ft.

Union Oil Co.'s No. 2 Keeran, Martin DeLeon Sur., 500 ft. E of E line of Gulf lease and 1,900 ft. N of railroad ..... T.D. 6,648 ft; sidetracked to sand 5,494-5,507 ft; set 1 joint screen; sanded.

WALKER COUNTY

Hart Oil Co.'s No. 1 Thompson, Jose Ortega Sur., 1,-265 ft. S, 1,876 ft. W of SW cor. of J. B. Gibson 71-ac. tract ..... S.D. 2,100 ft.

WALLER COUNTY

Birdwell et al's No. 1 Robertson, John Baker Sur., 1,-625 ft. from S line, 450 ft. from W line of 64-ac. tract ..... Derrick.

WASHINGTON COUNTY

Texas Oil Co.'s No. 18 Pomacal, S. M. Williams Sur., 1,382 ft. from W cor. of Shulz 44-ac. tract, thence 123 ft. NW at right angles ..... T.D. 1,515 ft.

WHARTON COUNTY

Herman Heep's (was Dayvault-Tyler-Gardner's) No. 1 Dayvault, Wm. Kincheloe Sur., 200 ft. SW, 600 ft. SE of N cor. of 298-ac. tract ..... S.D. 5,152 ft.

Pure Oil Co.'s No. 1 Stewart, 2,419 ft. NW, 1,650 ft. NE of S cor. of Sec. 15, Morris & Cummings Sur. ..... Drlg. hard sandy shale and pyrites 2,919 ft.

Smith & Daniels' No. 1 Mitchell, H.&T.C. Sur. No. 8, 330 ft. from NE line of NE 80-ac. tract in center of tract NW and SE ..... Drlg. shale 6,610 ft.

Stoed Prod. Co.'s No. 1 Tucker, 210 ft. W, 50 ft. N of NE cor. of S½ of SW¼ of Sec. 58, E.T.R.R. Sur. ..... T.A. 5,026 ft.

SOUTH LOUISIANA

BEAUREGARD PARISH

Beaver Pet. Co.'s No. 1 Long Bell, 755 ft. S and 155 ft. E of NW cor. NW NW Sec. 34-2s-8w ..... No report.

DeRidder Dev. Co.'s No. 1 McMahon, 200 ft. W, 156 ft. S of NE cor. of NW Sec. 23-2s-9w ..... Standing 1,284 ft.

Trapp & Turnbull's No. 1 Long Bell, 102 ft. N, 227 ft. W, out of SE cor. SE SW Sec. 26-2s-10w ..... Spudded and S.D.

Trapp & Turnbull's No. 1 Roberts, 600 ft. W, 150 ft. S of NE cor. NW NE Sec. 6-3s-10w ..... Location.

CALCASIEU PARISH

Cannon & Hughes' No. 1 J. S. Reed, Sec. 18-10s-12w ..... Derrick.

I. R. Irvine et al's No. 1 A. D. Mimma, 741 ft. N, 741 ft. W of SE cor. SE NE Sec. 20-9s-7w ..... S.D. 2,060 ft.

CONCORDIA PARISH

M. M. Stokes' No. 1 Pan American, 7,300 ft. W, 300 ft. N of SE cor. Sec. 18-9n-10e ..... Shale 1,573 ft.

JEFFERSON DAVIS PARISH

B. D. Finly's No. 1 Clarphy Lognion, SW NW Sec. 22-10s-4w ..... S.D. 1,670 ft.

Humble O. & R. Co.'s No. 1 Devilbiss, 1,650 ft. S, 350 ft. W of NE cor. of Sec. 14-9s-4w ..... Drlg. sand 4,196 ft.

LA FOURCHE PARISH

Lahulu Oil Co.'s No. 1 La. Fourche Land Co., 150 ft. out of SE cor. NW NW Sec. 32-18s-22e ..... Spudded and S.D.

PLAQUEMINES PARISH

The Texas Co.'s No. 7 Garden Island ..... Shale 1,104 ft; cmtd. 13⅜-in. csg.

ST. BERNARD PARISH

Cook Drlg. Co.'s No. 1 Delecroix farm ..... Sandy shale 5,040 ft.

TERREBONNE PARISH

The Texas Co.'s No. 7 State-Dog Lake ..... Salt 1,952-2,055 ft.

The Texas Co.'s No. 17 State-Lake Barre, 1,476 ft. W, 636 ft. S of NW cor. Sec. 20-21s-20e ..... Lime rock 3,783 ft; cmtd. 7⅝-in. csg.

The Texas Co.'s No. 4 Lake Barre-L.L.&E., 3,803 ft. S, 2,075 ft. W of NW cor. Sec. 30-21s-20e in Sec. 36-21s-19e ..... Comp. 740 bbls. daily; ½-in. choke, 3,980 ft.

The Texas Co.'s No. 8 Lake Pelto-State, 928 ft. S and 638 ft. E of NW cor. of Sec. 9-23s-18e ..... Rig.

VERMILLION PARISH

Shell Pet. Corp.'s No. 1 Herbert, 2,310 ft. W, 330 ft. N of SE cor. Sec. 10-15s-1e ..... Drlg. sandy shale 3,995 ft.

VERNON PARISH

R. R. Kay, tr.'s No. 1 Willis, 350 ft. N and 400 ft. E of SW cor. SE SE Sec. 32-3n-9w ..... Location.

Minerals Division Llano Co.'s No. 1 Llano Del Rio, 542 ft. E, 300 ft. S of NW cor. NW Sec. 34-2s-9w ..... Abd. 2,620 ft.

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FIELD PROBLEMS FROM READERS

Edited by Thomas F. Smiley

This department is conducted in order that men connected with the drilling, producing or transporting branches of the petroleum industry may obtain aid in solving problems that confront them in their work. Readers are invited to send questions freely. These questions will be placed in the hands of persons capable of answering them authoritatively, and the answers, based on the best available information, will be published.

Each question should give as much detail as possible, especially if it involves depth of sands, types of sands and operations on adjoining or nearby properties. The source of questions will be considered confidential, and only the initials of the sender will be published. Questions involving patented processes, intricate formulas or estimates of cost cannot be answered. If an immediate answer is important, one will be given by mail when the writer requests it.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or improved old ones.

Plotting the Production Decline Curve for Income Tax Uses

We wish to obtain some information as to the method of plotting production decline curves and figuring reserves in the East Texas Field for income tax purposes. With these wells shut in as they are and no data on which to base such decline curves we are wondering how this is to be done. We are familiar with the Government's form O, the method used to figure decline curves where a well is producing all of the oil it made, but we are at a loss how to figure reserves and the decline of production under proration such as they have in East Texas, where the wells have not been allowed to produce the full quantity at any time. We would appreciate it if you could give us this information or put us in touch with somebody who can give it.—A. D. S.

The income tax department appraisers are as puzzled as anybody else over the question you raise. Information received is to the effect that the usual practice is to use figures based on a general knowledge of the individual property, and if these estimates are reasonably conservative there is small likelihood of their being challenged. One engineer in the employ of a major oil company considers the following factors in arriving at an estimate of recovery, these factors being listed in their degree of importance:

1. Structural position.
2. Permeability of sand.
3. Development—acres per well.
4. Thickness of sand.
5. History of lease.

In using this method the engineer referred to has found that his estimate of recovery for the company's leases varies from 1,250 to 25,000 bbls. per acre, with the average around 15,000 bbls.

Another company uses bottom hole pressure date in its general work and if you have access to A.A.P.G. bulletin for September, 1932, you will find an article by C. V. Millikan on "Application of Bottom Hole Pressures" in which there is a graph of conditions under a lease in East Texas Field that should be of interest to you.

It may be well to consider the advisability of being conservative in estimating recovery and not delaying the rate of depreciation too long so that in the course of three to five years production costs will be high because of the necessity of adding to depreciation the pumping costs.

If possible, it is good practice to depreciate the property before it is required to go on the pump because by this method the average production costs per barrel of oil will be more nearly a straight line throughout the life of the property than would be the case if at some period it is necessary to carry both depreciation and lifting costs at the same time.

Overvaluation is to be avoided. In the past many companies have had to write off millions of dollars during the later life of leases because they had placed their ultimate recoveries far too high at the start.

It is better to adjust future recoveries from year to year as conditions indicate than to place them high early in the life of the property only to find later that the lease cannot make the quantity of oil estimated.

In some East Texas properties that will be affected by repressuring by water drive there will be practically no decline curve. As fast as one body of oil is taken out fresh oil will be driven in by the water movement. This condition will also have its effect upon leases near the water which will give up their oil to others up-dip and it is a factor to be considered in valuation.

From all that can be ascertained, the practical way to value East Texas oil property is to take into account all factors and by a close study of each with relation to the others place some arbitrary per acre recovery value upon the individual property. This may be changed from year to year as necessary, and this practice apparently is being accepted as fair by the income tax officials.

Desires Formula for Computing Natural Gas Field Reserves

Can you advise me of the formula for computing gas reserves in a field, having knowledge of the pressure drop and the production for a given period?—P. H.

If you will refer to The Oil and Gas Journal of May 14, 1931, page 82, you will find a formula that will meet your needs. As it is long and involved, it will not be reprinted here. If you desire additional information consult the article prepared by E. O. Bennett and H. R. Pierce on "New Methods for the Control and Operation of Gas Wells," and published in The Oil and Gas Journal June 4, 1926, page 56.

It is suggested that you obtain from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., copies of Report of Investigations, Nos. 2929 and 2930, by H. R. Pierce and E. L. Rawlins on "The Study of a Fundamental Basis for Controlling and Gauging Gas Wells."

Well's Value Not Likely to Be Impaired Much by Shutdown

Oil operators in this district have been considering a shutdown from time to time and I would like to ask about a point that has been the subject of a good deal of discussion in talking over the plan. I refer to the possibility of damage to a well through not producing it. The preponderance of opinion seems to be that a shutdown will not hurt a well, but there are a good many practical oil men of long experience here who insist that a shutdown is likely to be injurious, that is, that the total quantity of oil recovered from a well that produces without interruption will be greater than the quantity taken from a well that is shut down for a period.—E. T. S.

This general question has confronted the oil man ever since petroleum has been produced from drilled holes. Under the older theory of competitive drilling and production there existed the idea that wells could not be controlled as to rate of flow without losing oil and gas to neighboring wells. Since many fields have been operated under restricted rates it has been found that recoveries have not been effected and in many cases it would seem that the ultimate yield of oil has been increased.

It is impossible to operate a field under both conditions so it will never be possible to make direct comparison of open flow and restricted production methods, but decline curves on fields where restricted production has been applied compared with decline curves of other fields where the sand conditions were similar indicate that controlled rate of production has not diminished the amount of oil recovered.

As to actually shutting in wells for a long period of time, there does not seem to be any data available upon this point, but in L. C. Uren's book, "Petroleum Production Engineering," he recites the following occurrence:

"It has been shown, however, in certain California fields that production lost by failure to operate the well at its normal capacity is at least partially regained subsequently by increased productivity when conditions are again brought back to normal. In the Coalinga Field of California, for example, many wells were idle for a period of four months during 1930 as a result of a strike of oil field workers. A study of production figures indicated that the production lost during this period was regained during the few months immediately following resumption of operations, so that the wells again followed the production curves previously computed for them.

"Uniformity and regularity in the decline rate of course assumes that the wells will not be subjected to conditions which may vitiate the expulsive forces. A new well drilled within the area drained by an older well will at once reduce the productivity of the older well, and the new well will lack the high initial production characteristic of wells drilled in uninfluenced territory."

There is an interesting discussion of "Effect on Producing Wells of Shutting In the Offset Wells" by C. M. Nickerson, petroleum engineer, U. S. Navy Department, Los Angeles, Calif., printed in A.I.M.E. Petroleum Development and Technology, 1928-29. This applies to conditions in an oil field in the San Joaquin Valley, California.

It seems to be quite generally accepted among petroleum engineers and production superintendents now that if it is economically necessary to shut in production it can be done without material damage to the wells, provided that reasonable care is taken to clean the holes before shutting down so that foreign material will not be pressed back into the face of the sand by fluid that may accumulate in the well during the shutdown period.

Determining Curve Described by Pumping Well Walking-Beam

Will you kindly advise me how to determine the curve which the end of a walking-beam on a pumping well describes?—C. H. C.

Formulas for a circular curve contained in Kent's Mechanical Engineering Handbook answer your question.

If you have access to a drafting table it is suggested that you make a sketch of a walking-beam, establishing the center of the bearings, and then spot the center of the bearing carrying polished rod or temper screw. If this bearing point is above, below or in line with the center of the walking-beam bearing, it should be noted on the sketch.

The distance between the center of the walking-beam bearing and the bearing at the end of the beam will be the radius of the arc of a circle described by the beam in motion. By striking this arc on the paper and then checking against it the length of stroke it will be possible to trace the variation of the movement of the bearing carrying polished rod and to note its deflection from a vertical path.

Why Was It Called That?

HOUSTON

Houston, Tex., headquarters of Gulf Coast oil operations, was named after Gen. Sam Houston, whose ancestors came to America from Ireland and settled in Virginia, where Sam was born. One branch of the family migrated to Pennsylvania, where the name often is mispronounced "house-tun." The correct pronunciation is "hews-tun." Houston Street in New York is pronounced "house-tun," not "hews-tun," and many families in northern states bearing the name pronounce it the same way. "House-tun" is also the common pronunciation of this name in the British Isles.

PERSONAL PARAGRAPHS

Max W. Ball, Denver, Colo., was a visitor to Wichita, Kans., last week.

* * *

Malcolm Berenger, an executive of the Standard Oil Company of California, sailed for Europe.

* * *

C. S. Farquhar, chief accountant at Houston, Tex., for The Texas Company, is in Tulsa on company business.

* * *

R. F. Clement, chief clerk of the Oklahoma-Kansas-Kentucky production division of The Texas Company, who has been ill, has recovered.

* * *

K. D. Pardee, division superintendent of The Texas Company with headquarters at Billings, Mont., is in Denver, Colo., for a short visit to his company's offices.

* * *

Ford Bradish, Fort Worth, Tex., consulting geologist, spoke recently before the Fort Worth Geological Society on "General Geological Reconnaissance of Northern Ontario, Canada."

* * *

Robert C. Tuttle, manager of the marine department of the Atlantic Refining Company, has been appointed a member of the executive committee of the Port of Philadelphia Ocean Traffic Bureau.

* * *

George W. Cook, for many years drilling superintendent for the Magnolia Petroleum Company in a number of the flush fields, has retired under the company's annuity plan and will make his home in Wewoka, Okla.

* * *

Frank Phillips, president, and L. E. Phillips, chairman of the executive committee, of the Phillips Petroleum Company, are spending a few weeks in Florida, where L. E. Phillips is recuperating from a recent illness.

* * *

G. Raymond, chief engineer of Black, Sivalls & Bryson, Inc., at Oklahoma City, Okla., has just returned to his headquarters after a trip to the various fields and company offices in Texas. Mr. Raymond just recently moved his headquarters from Kansas City, Mo.

* * *

W. K. Evans, formerly general manager for Shell Petroleum Corporation in Chicago, and more recently sales manager of Graver Tank & Manufacturing Company, East Chicago, has been made superintendent of retail sales for the Texas Oil Company in the central division, which extends from Pennsylvania to Colorado.

* * *

Bailey W. Hardy has been elected executive vice president and general counsel for the Independent Petroleum Association of Texas. He will move the offices of the organization from Wort Worth to Austin in order to keep in touch with legislative and railroad commission affairs. He succeeds Claude Wild, who recently resigned.

* * *

F. C. Elbell, who for the past four years has been manager of the advertising and publicity department of the Worthington Pump & Machinery Corporation, New York, has resigned. He brought to Worthington a well-rounded advertising, merchandising, sales promotion and publicity experience. No announcement has been made concerning his future plans.

* * *

E. B. Rubsamen, of the S. R. C. Oil Company, has been elected president of the San Antonio Petroleum Club. L. F. McCollum, of the Humble Oil & Refining Company, vice president; J. F. Haworth, secretary and treasurer, and Francis L. Corrigan, assistant secretary and treasurer. These with Ed W. Owens, Val T. Billups, Dilworth S. Hager, Alex Chitwood, Lemar Seeligson, F. P. Zoch, P. H. Swearingen, H. J. Porter, Edwin M. Jones, Al Buchanan, Walter Negley and T. J. Galbraith, constitute the board of directors.

Mr. and Mrs. Charles F. Urschel have returned to their home in Oklahoma City, Okla., from the East.

* * *

John Hassler has been appointed secretary of the Oklahoma Corporation Commission, succeeding Ed Hicks, resigned.

* * *

J. R. Travis, president of the Rock Island Refining Company, Duncan, Okla., is recovering from a prolonged illness from rheumatism.

* * *

L. C. Wallach, managing director of Sterns, Ltd., of London, England, is on a visit to the United States prior to a trip to Central America and the West Indies.

* * *

H. G. Naylor has been appointed assistant general manager, bulk sales division (gasoline and refined oil), according to an announcement of Edward G. Seubert, president, Standard Oil Company of Indiana.

Men of the Industry

WILLIAM IVEY

William Ivey, chairman of the Kern River Oilfields of California and a director of the St. Helens Petroleum Company, was born June 16, 1861, in London, England, in which city he resides. In addition to his affiliation with the Kern River Oilfields Company and the St. Helens Petroleum, Mr. Ivey is chairman of the Kern Trinidad Oilfields, Southern Trinidad Oil Syndicate, Kern Romana, Kingsway & General Property Trust and the Hesketh Estates, Ltd. He is also a director of Tampico Oil, Ltd., Droitwich Development Company, Sevenoaks Electric Supply Company, Chislehurst Electric Power Company and deputy chairman of the London General Appointments Bureau. In 1897 he was elected mayor of West Ham, a city of 320,000 population, later annexed to London.

In 1911, Mr. Ivey was elected a director of the Kern River Oilfields of California and the next year was elevated to chairman of the board which position he retains. He was appointed chairman of the Oilfields of England in 1915 and thus became the executive officer of the first company to drill for oil in England by special license of the British government. Mr. Ivey was a founder and second worshipful master of the Bishop of Barking Lodge of Masons. He received special London rank in 1909.

Leslie H. Blumenthal, of the Vacuum Oil Company, has sailed for Europe.

* * *

P. N. Boggs, vice president and member of executive committee and of board of directors of Union Oil Company of California, has resigned.

* * *

J. W. Portis has recently moved from Midwest, Wyo., to San Diego, Calif. Mr. Portis was formerly employed by the Midwest Refining Company.

* * *

Jess Scarborough, superintendent of land and scouting department of Mid-Continent Petroleum Corporation, is making a business trip in Texas.

* * *

R. S. McKeever, Smith Separator Company, has recently been transferred from the Dallas, Tex., office to Tulsa where he will have charge of sales promotion work.

* * *

T. B. Gregory, vice president of Columbia Gas & Electric Corporation, accompanied by Mrs. Gregory, has sailed from New York for California, via Havana and the Panama Canal.

* * *

B. A. Laselle, independent oil producer of Ada, Okla., credited with drilling the discovery well in the Bebee Pool, in Pontotoc County, Oklahoma, is now prospecting for gold in Mexico.

* * *

E. L. Bell, Deep Rock Oil Company, Drumright, Okla., and vice chairman of the Mid-Continent section of the American Petroleum Institute division of production, was called to his old home at Laurel, Md., to attend his mother's funeral last week.

* * *

Sir John Cadman, chairman of the Anglo-Persian Oil Company, and William Fraser, deputy chairman, accompanied by expert advisers, will soon leave for Teheran, Persia, to discuss a settlement of the dispute over the cancellation of the company's concession.

* * *

George W. Fuller, consulting engineer of Fuller & McClintock, New York, has been elected chairman of the Engineering Foundation to succeed H. Hobart Porter. John V. N. Dorr, president of the Dorr Company, New York, was elected to the executive committee.

* * *

C. D. Buffett has been made superintendent of the Rocky Mountain producing division of the Stanolind Oil & Gas Company with headquarters at Casper, Wyo. George Jenkinson is head of the land department, A. G. Fidel is purchasing agent, J. G. Bartram is geologist, with John Evans and Earl Fry as assistants.

* * *

R. M. McNeilly, Refiners Petroleum Company, has been elected president of the Chicago Oil Men's Club. Other officers named are: Page B. Watson, Sun Oil Company, vice president; Richard F. Brennan, Petroleum Exchange Corporation, secretary; Frank E. Spencer, Spencer Petroleum Company, treasurer; and I. A. Archambault, Pennsylvania Oil Company, and J. Loeffler, Commerce Petroleum Company, directors.

* * *

L. F. McCollum, chief geologist of the San Antonio, Tex., district of the Humble Oil & Refining Company, was elected president of the San Antonio Geological Society at the annual meeting, succeeding Ed Owen, geologist for L. Wentz. Fred P. Shayes, geologist for the United Production Company, at Beeville, was elected vice president; J. Q. Myers, of the Shell Petroleum Corporation at San Antonio, was elected secretary-treasurer; and Joe M. Dawson, division superintendent and geologist for the Gulf Production Company at San Antonio, was elected district representative to the American Association of Petroleum Geologists, and these officers with Dilworth S. Hager, consulting geologist of San Antonio, constitute the board of directors.

NATURAL GAS DEVELOPMENTS

Panhandle Gas Operators Appeal to Legislature

AUSTIN, Tex., Feb. 20.—Panhandle gas well owners and operators told committees of the two houses that the statutes prohibited them from using their gas for any purpose other than light and fuel, but the major pipe line companies would not give them connections. The delegation appeared in support of a bill by Senator Clint Small to permit gas to be used for the extraction of gasoline and the manufacture of carbon black. A like bill had been offered in the house. The bill originally applied to sour gas only but Senator Small said an amendment would be offered to allow sweet gas to be used for purposes other than light and fuel.

Members of the delegation included Will Herring, Amarillo; Lawrence Hagy, Amarillo; Joe Williams and John Sherrin, representing the Shamrock Oil & Gas Co. of Amarillo. Advocates of the bill stated they would be glad to restrict the uses of gas to light and fuel if the major pipe line companies, which also have considerable production, would divide the market.

Charles Keffer, of Amarillo, attorney representing the Amarillo Gas Co., tried to show through questioning that the independent producers wanted a larger share of the market than their pro rata part. He added that the oil wells in nearby fields were draining the larger gas companies' reserves faster than the gas wells of the majors were draining the independents' reserves.

Mr. Herring, who owns 22,000 acres in the sour gas area, told the committees that "we're being held in reserve. The other areas are draining from under our properties, and our properties rapidly are being confiscated."

Mr. Herring stated his taxes had been increased 300 to 400 per cent because of the mineral potentialities of his properties, but that he had never been able to sell any gas to the pipe line companies which control the gas market.

Senator Small told the committees that 21 per cent of the open flow of gas in the Panhandle "has no outlet whatever." Persons at the hearing pointed out that sour gas had to be processed before it could be used for fuel, and that the pipe line companies did not want that kind of gas.

Mr. Hagy said his properties had been drained as much as 13 per cent in one year. He asserted he had no outlet.

All of the independent producers stressed the contention that their properties were being drained on one side by the Panhandle oil fields and on the other by the gas wells of the major companies.

NEW GAS RATES AT CHATHAM

CHATHAM, Ontario, Feb. 18.—As a preliminary to the negotiation of new gas rates for Chatham the Union Gas Co. has given formal notice terminating the rate agreement now in force there. It is expected a new rate structure will be arranged by negotiation.

GAS TESTS IN TENNESSEE

Drilling for natural gas has been started near Chattanooga, Tenn., by the Sequatchie Gas Co. It is said the formation is favorable for the accumulation of gas deposits.

HENRIETTA MUNICIPAL PLANT?

HENRIETTA, Tex., Feb. 20.—Ray Dawson of Oklahoma City appeared before the city council with a proposition to supply this city with gas from wells owned by him in the Hurnville community, north of Henrietta. His contract would include the laying of a gas main to the city limit, having the city to take care of the distribution service.

Mr. Dawson was instructed to gather all needed information as to rates, rock pressure of the wells and the estimated life of the field and to present these to the council.

Gas Line to Vancouver From Fraser Valley Area

CHATHAM, Ontario, Feb. 18.—Further details have been made public regarding the project of the Natural Gas Development Corp., Ltd., of Vancouver, British Columbia, for the systematic development and marketing of natural gas production from the Fraser Valley area in British Columbia.

The company was organized last fall at Vancouver with capitalization of $500,000 in $1 par shares. While numerous attempts have been made by local companies to develop oil production in the Fraser Valley area, the gas potentialities in the wells drilled by these companies appear to have been disregarded, although numerous gas shows were reported in the deep drilling for oil.

Natural Gas Development Corp., Ltd., officers include: President, A. Wells Gray, New Westminster; vice presidents, Col. H. T. Goodland, Victoria; E. O. F. Ames, Vancouver; chairman board of directors, A. D. Paterson, Ladner; directors, E. S. Estlin, George W. Mitchell, Vancouver; and secretary-treasurer, William M. Silcock, Vancouver. E. S. Estlin, formerly natural gas commissioner for Ontario, will be field engineer.

The company has secured approximately 5,000 acres of leases in three potential gas areas, the Fraser Valley, Lulu Island and Boundary Bay districts, all within easy pipe line distance of Vancouver and New Westminster. The leases at Boundary Bay include a deep well drilled some years ago by the Boundary Bay Oil Co. This well encountered gas at around 2,400 feet. At the time the flow, forcing itself through drilling mud, sand and water was estimated around 500,000 feet, but with the hole cleared would have probably been much larger. The hole was drilled deeper for oil and was ultimately abandoned without any effort to utilise the gas.

The company's No. 1 test will be drilled in the SW NW Section 34-3, Delta Municipality, New Westminster district, in close proximity to Boundary Bay's No. 1. Contract has been let on a half cash, half stock basis; and leases have been secured for a stock consideration only. It is expected that production will be marketed through existing artificial gas organizations, and tentative marketing arrangements have already been made. It is expected that No. 1 well will be started early in the spring. While no large commercial marketing has ever been undertaken, natural gas from old wells in this part of British Columbia has been used locally by some consumers for many years.

ARKANSAS CARBON BLACK BILL

SHREVEPORT, La., Feb. 20.—A bill has been offered in the Arkansas legislature by Representative Taylor to repeal the anticarbon black law of 1928, permitting the use of surplus gas for carbon manufacture. It is provided that all gas testing more than half a gallon of gasoline to the thousand feet must be run through natural gasoline plant before being burned for carbon and a privilege tax of half a cent per thousand feet of gas burned for carbon is exacted in addition to all other taxes, the extra half cent to go to the school fund. Also an application fee of $50 is levied.

Difficulties Encountered in Mexico City Gas Plant

Following reports that natural gas was going to be piped to Mexico City, and that this would be the first time Mexico City had had gas service. F. H. Bivens of the Southern Counties Gas Co., Los Angeles, Calif., was asked by the American Gas Association to recall a previous project. He writes:

"I had charge of the construction of the gas plant in the City of Mexico, which was started in 1908 and gas service established in 1910. This plant was an oil gas plant, with two generators of a semistraight shot type, each having a daily capacity of approximately 1,500,000 feet. There were two holders, one a relief holder of 300,000 feet capacity, and a storage holder of 500,000 feet capacity. The plant was built about 5 miles from the city proper, due to the fear of an explosion of the gas plant, and the line laid into the city was of 6-inch steel, screwed joints, approximately 5½ miles in length. The distributing system, of which there was about 45 miles, consisted of a short header line of 8-inch cast iron pipe, and the remainder of 4-inch and 6-inch cast iron bell and spigot pipe, 12-foot lengths, joints made with calked lead wool.

"The soil conditions are very poor in Mexico City, due to the fact that there is no natural drainage, and in all instances at a depth of from 1½ to 3 feet, the lines are laid in water. Therefore, the corrosive conditions are extremely bad, and I assume that this steel line, since it was only protected by a red lead coating, is completely gone. The services of 1-inch or 1¼-inch, with the exception of a very few 2-inch, were also of steel protected only by a coating of red lead.

"Since that part of the country is frequently visited by quite severe earthquakes, during the time the plant was in operation, frequent breakages in the line were occasioned by earthquakes. Other breakages were caused by the settling of the line on account of the mushy, unstable soil conditions. The plant operated until late in 1913, when due to the revolution they were unable to get oil into Mexico City, and the plant was shut down. I am informed that it was again placed in operation for a short period of time in 1917, but due to the bad condition of the distributing system, it was soon abandoned. When the plant was placed in operation, the principal revenue was from lighting, due to the high electric rate, and the unsatisfactory service. Electricity was at that time, as I recall it, 11 cents, gold, per kilowatt, with frequent outages.

"Due to the particular class of people, and the fact that labor was extremely cheap, and that the servant type had been trained in the use of charcoal only, it was practically impossible to secure any domestic cooking. All of the homes of the better type were equipped with charcoal burners, which were built in, and it was almost impossible to induce them to purchase gas ranges.

"An effort was made to equip these charcoal burners with gas burners which did not prove entirely satisfactory due primarily to the fact that it was so very difficult to educate the servant type to use gas. The company employed some eight of ten women demonstrators to follow up all installations, endeavoring to teach the servants the use of gas, but this did not prove satisfactory, due to the frequent changes in help and the necessity of educating each new servant. Some gas was sold for water heating, but this too was very limited, as it was only in the American Colony, which at that time consisted of some 15,000 people, where they were accustomed to the use of hot water."

New Saskatchewan Line Reported Being Planned

CHATHAM, Ontario, Feb. 18.—A proposition is being made to the city of Regina, Saskatchewan, by Thomas McManus and associates of Oak Park, Chicago, for the delivery of natural gas from the Bowdoin Field in northern Montana. The interests backing the project are understood to have arranged with the Tenney-Williams interests for a gas supply from the Bowdoin Field, which is to be piped to Regina and Moose Jaw. The associated companies plan to spend around $3,500,000 in drilling in the Montana field, installing gathering lines and delivering the gas at the international boundary at a rate of 20 cents per 1,000 feet.

The cost of the main pipe line from this point to Regina and of the lateral line to Moose Jaw, with compressor stations and complete distributing systems for the two cities is estimated between $4,500,000 and $5,000,000. It is proposed that the Saskatchewan government guarantee the bond issue to finance this portion of the undertaking, the cities obligating themselves to reimburse the province by repayments out of gas earnings over a term of years.

A tentative rate schedule, planned to amortize the investment in a 15-year period out of earnings, involves a rate of 22 to 24 cents to industrial users and 47 cents to domestic consumers. A 55-cent rate would pay out in 10 years, according to calculations.

A previous proposal of the Power Co. of Canada, a Montreal organization, to construct a 175-mile pipe line from the Bowdoin Field to Regina was accepted last year by the Regina city council but was later withdrawn by the company owing to the difficulty of financing the project. Alternative schemes urged by other interests contemplated the piping of gas from proven fields in Turner Valley and east central Alberta, or developing potential gas areas in Saskatchewan.

GALVESTON RATE HEARING

GALVESTON, Tex., Feb. 20.—A new schedule of gas rates, calling for a monthly charge of 85 cents per 1,000 feet up to 20,000 feet, and a charge of 65 cents per 1,000 feet in excess of 20,000 feet, with no service charge and a minimum bill of 75 cents per month, was approved by the city commissioners.

Mayor Jack E. Pearce set March 2 as the date for a hearing, at which time the Texas Cities Gas Co. is invited to show cause why the rate should not be put into effect. The principal change under the proposed new schedule is elimination of the 75 cents per month service charge. The present rates are 85 cents per 1,000 feet for the first 3,000 feet and 80 cents per 1,000 feet for the next 5,000 feet.

PANHANDLE GAS HEARING

AMARILLO, Tex., Feb. 20.—A hearing of the Texas Railroad Commission concerning a petition of the Shamrock Oil & Gas Co. will be held in Amarillo Saturday, February 28. The petition seeks a declaration of northeast Moore County as a separate pool distinct from the general Panhandle Field for the purpose of proration. The date is also set for the hearing of the petition of Hagey, Harrington and Marsh for a permit to process gas for gasoline from their seven gas wells. The two hearings will be combined.

TECHNICAL QUESTIONS ANSWERED

By Charles K. Francis, Ph. D., Technical Editor

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible.

Inquiries must be signed but only the given initials will be printed. The source of the questions is considered to be confidential.

Questions requiring a discussion of patents, the use of intricate formulas, extended computations, or cost estimates cannot be considered.

When the matter is of general interest the reply will be published within a reasonable time.

Influence of Temperature on Denatured Alcohol and Gasoline

Will you please advise to what extent denatured alcohol is affected by climatic conditions? To what degree will it be affected by temperature in comparison with gasoline?—O. V. K.

Denatured alcohol is the name applied to ethyl alcohol which has been rendered unfit for human consumption by the addition of some objectionable substance. The substances recommended for this purpose are added in comparatively small quantities so can have but little influence on the freezing point; consequently the constants for ethyl alcohol will serve for ordinary purposes. The freezing point of ethyl alcohol is —179° F. and the boiling point 173° F. These are outside any condition that may be found as to surface temperatures, but the low boiling temperature results in loss when it is used as a radiator solution and it must be frequently replaced if adequate protection is maintained against freezing. The common practice is to use a 50 per cent solution, which freezes at —24° F.

It may be advisable to call attention to the fact that methanol, wood alcohol, is sometimes sold as denatured alcohol, but this is a mistake. Methanol solutions are more volatile, lower boiling points, than the corresponding solutions of ethyl alcohol and the losses are therefore higher. The commercial grades of wood alcohol are not pure and sometimes contain traces of acid which tend to corrode the parts of the motor.

Gasoline is an indefinite mixture of several hydrocarbons, the percentage of each depending upon the source of the crude oil and the refining process, the freezing point for the individual compounds varying from approximately 300° below zero to about 0° F. The hydrocarbons with the higher boiling points also freeze at the higher temperatures. Therefore, a gasoline meeting the commonly recognized specifications will not solidify at any temperature that may be found in the United States.

Occasionally, during extremely cold weather, instances of gasoline having frozen have been reported, but upon investigation it has been found that the frozen substance was water. If the gasoline is kept free from moisture this difficulty will not arise.

During cold weather it is important that the gasoline contain more of the low boiling hydrocarbons than during the summer season to give quick firing and easy starting at the low temperatures. This volatile portion should be adjusted for warm weather, that is reduced, to avoid the formation of excess quantities of light vapors which may produce vapor lock.

Introducing Ammonia Into Vapors for Corrosion Control

We would appreciate recommendations covering the set-up for introducing ammonia into still vapors to prevent corrosion. What is the proper quantity that should be used when handling the sour crudes of this section?—H. W.

Ammonia is used chiefly for combating chloride corrosion, resulting from the action of hydrochloric acid produced by the decomposition of the salts present in the oil. The use of ammonia for this purpose has been discussed in several articles that have appeared in The Oil and Gas Journal. Reference is made to the contributions by R. E. Woodward, March 5, 1931, page 139; Shaffer and Pollock, March 31, 1932, page 78, and November 17, 1932, page 88.

Mr. Woodward describes a unit in which the anhydrous ammonia is introduced from the cylinder through a half-inch line to the selected point in the distillation equipment. It is well to have a trap consisting of an inverted U rising 3 or 4 feet upward from the vapor line connection. Failing this a check valve may be used, the object being to prevent condensation and flow of liquid into the flow meter. The cylinder, set on the ground with the outlet raised slightly, is turned around in such a position that the goose-neck points to the top inside the cylinder taking off the ammonia as gas. The gas passes through a flow meter, which by means of an orifice and manometer registers on the scale a direct reading in pounds of ammonia flowing per 24 hours. The differential control valve may be set to give a predetermined rate of feed correct to within 2 per cent.

Shaffer and Pollock, in the November 17, 1932, issue, mention the following:

Equipment for an ammonia storage and distributing system is relatively simple. A drum or two drums (discarded pressure drums from cracking equipment are usually satisfactory) capable of withstanding 200 pounds per square inch pressure and having a capacity of 50,000 to 60,000 pounds of liquid ammonia in order to unload a tank car of 50,000 pounds will provide enough storage for most ordinary purposes.

A light roof to cut off the direct rays of the sun is all that is necessary as a covering for the storage drums, provision for supplying heat (such as a small steam coil) being desirable during the colder months. Distribution of ammonia gas is made by 1-inch steel lines reduced to one-quarter inch at each condenser; control of each stream is effected by a needle valve in a commercial meter of the manometer type which also indicates the rate of flow in cubic feet per minute.

Total amounts to each unit may be measured separately by recording meters on each main line or by passing all the gas through one meter and prorating the amount back to each unit by the meter settings. The liquid ammonia pressure is reduced by two valves, 110 and 45 pounds respectively, so that the gas is easily delivered to the condenser vapor line against the usual 0 to 2 pounds per square inch back pressure.

Connection to the vapor line is made by an inverted U bend to prevent condensate collecting and running into the meter. Arrangements are also made to feed a small quantity of water to the vapor line so that the normal amount may be augmented if necessary to insure removal of ammonium salts.

Not all streams from the same crude, nor do all crudes, require the same treatment. As hydrochloric acid is the main cause of corrosion of condensers on crude batteries, the most serious effect will be expected towards the front end of the battery, and the intensity of the corrosion will depend largely on the amount of water present in the crude and the salinity (calcium and magnesium) of the water.

These authors found the use of 3 pounds of ammonia per 1,000 bbls. enough to reduce the iron loss 80 to 90 per cent.

An obvious method of control would be determining the pH value of the separated water and so adjusting the ammonia until neutrality is reached. A second method which has been practiced is actually to determine the quantity of chloride and iron present in each stream. A number of determinations have shown that the iron-chloride ratio is approximately 0.834 in such cases as when no ammonia is used; this, on an equivalent basis, approximates 1.06 : 1. Thus, if ammonia is added in slight excess of the amount equivalent to the chloride, the iron loss will be taken care of.

The simplest control is by means of indicators added to the condensed water, when it is clear, or to moistened filter paper; phenolphthalein or Cresol Red for alkalinity, potassium ferrocyanide for iron.

United States Produces Largest Quantity of Benzol

We would like to know what country leads in the production of benzol. If you can give any information as to the volume produced by other countries it would be appreciated.—H. M.

The table following shows the main sources of benzol according to the latest available reports, which are for the year 1931:

BENZOL PRODUCTION FOR 1931

Country—	Tons
United States	420,000
Germany	260,000
United Kingdom	100,000
France	78,000
Belgium	35,000
Saare	31,000
Czecho-Slovakia	26,000
Holland	22,000
Poland	19,000
Italy	5,000
Spain	3,700

Stability of Products Related to Source of Oil and Refining

Why is it some gasoline goes off color and deposits gum much quicker than another gasoline of the same specifications?—P. W. A.

The stability of any petroleum product is related to the type of petroleum from which it is derived, the kind of refining, the thoroughness of the purification processes, and the storage conditions. An article, "Fundamentals in the Problem of Resistance to Deterioration," by Prof. Hugh S. Taylor, Proc. A.S.T.M., 32, II, 1932, reviews the various processes of deterioration and their control. The following is from the section under "Hydrocarbons":

The problem of deterioration in respect to hydrocarbons includes the keeping qualities of gasoline and transformer oils. In the former case the problem has recently become more acute by reason of the greater production of cracked gasolines with a relatively high concentration of unsaturateds with especial emphasis on the presence of diolefines. The tendency to gum formation in gasolines is due mainly to the diolefines although the simple ethylenes may form gum on extended oxidation. Kogerman showed recently that 2-4 hexa and pentadiene absorb 2 moles of oxygen per pair of double bonds yielding compounds similar to the gums obtained in cracked gasoline. It is well known that absorption of oxygen is a preliminary stage in the development of gumminess in such gasolines and the rate of absorption is of the now familiar auto-acellerative type accompanied by the accumulation of peroxides. There is a preliminary induction period during which, undoubtedly, inhibitors, probably of a phenolic nature, present in the natural materials, are performing their function as retarding agents. Peroxides added initially to the gasoline eliminate the induction period, presumably through oxidation of the inhibitors. The natural inhibitors may be removed by alkali washes, whereupon, again, the induction period is shortened. The interaction of added peroxides with inhibitors, destroying these latter, is not without its important practical significance in the technique of inhibitor addition. It suggests that, for maximum inhibitor efficiency, the gasolines to which they are added should be as substantially free from peroxides as practical. Otherwise the inhibitors will be readily removed by oxidation and their retardation efficiency destroyed. The high temperatures of cracking distillations are generally sufficient to decompose any peroxides present so that a freshly distilled cracked gasoline should be substantially free from peroxides. It is at such a stage that maximum inhibitor efficiency may be obtained. The lower temperatures of straight distillation may not be high enough to decompose peroxides which may, therefore, be carried over. These should be removed prior to inhibitor addition for maximum efficiency of the latter.

The gummy deposits found in some petroleum distillates is largely due to the formation of peroxides, which may be accelerated by catalytic compounds of copper, iron, lead, manganese and cobalt, but may be inhibited by antioxidants, among which, being recognized as useful for this purpose, are hydroquinone, anthracene, acetanilide, phenol, methylaminophenol, and the corresponding benzyl derivative.

NEW AND IMPROVED EQUIPMENT

Northern Introduces New Line of Hydraulic Pumps

The Northern Pump Co., Minneapolis, Minn., announces a complete new line of hydraulic pumps and motors of the rotary radial piston type available in sizes from 1 to 200 gallons per minute and pressures of 4,000 pounds per square inch, pumping oil for hydraulic systems. The volume of discharge can be changed to deliver any amount from 0 to the maximum capacity of the pump, and the discharge can be reversed without stopping the pump or changing the speed of rotation.

Advantages of the Northern hydraulic pump drives are enumerated by the manufacturer as follows: (1) Sensitive control of speed by pump discharge regulation; (2) automatic speed increase; (3) smooth action because of hydraulic automatic control; (4) reduced maintenance because the hydraulic medium is lubricating oil, which constantly lubricates all working parts; (5) power consumption reduced by using small prime mover; (6) efficiency increased by eliminated gearing (7) maximum pressure available with minimum speed and horsepower consumption; (8) freedom from fire hazard; (9) flexibility of design and application for special purposes.

The series is available with automatic controls and semiautomatic valve mechanisms. All the pumps are fitted throughout with nitralloy and incorporate a balanced pressure design whereby hydraulic forces are balanced to prevent heavy bearing loads at high pressures.

Three New Tractors Are Offered by Caterpillar

Three new Caterpillars are announced by the Caterpillar Tractor Co., Peoria, Ill. They are the Caterpillar Seventy tractor, the Diesel Seventy and the Diesel Fifty.

More power, weight and endurance are said by the manufacturer to have been built into the new seventies, increasing their range of usefulness in the oil fields. Diesel or gas engines are set in the same rugged chassis. Features enumerated by the manufacturer include: New proven track design, new swing frame construction, six track rollers on each side, advanced idler design, sturdier final drives to handle increased power, weight and balance for performance, more effective oil seals, increased traction, greater accessibility, Diesel or gasoline power, adjustable pedals, single gear-shift lever, handy upright steering control and high visibility.

The Diesel Fifty engine, differing chiefly in size only from the larger Caterpillar Diesel engine familiar to oil field workers, gives purchasers of the Caterpillar Fifty tractor the choice of Diesel engine or gas engine power. Generating its power on low price fuels, the Diesel Fifty tractor offers a compact, mobile unit which is said to effect marked operating economies.

NEW WATER DISPERSIBLE WAX

Emuwax is the name of a new water-dispersible wax introduced by the Glyco Products Co., Inc., of Bush Terminal, Brooklyn, N. Y. It is arousing interest because of its flexibility, light color and emulsifying properties. It is soluble to a greater extent than natural waxes in organic solvents. It disperses readily in hot water to give milky emulsions. It acts as an emulsifier for oils and waxes for polishes, creams, lotions, textile rubber softeners and lubricants. Emuwax melts at 115.8° F. and will not turn rancid.

Among the Equipment Houses

The St. Louis Surfacer & Paint Co., St. Louis, Mo., has established a sales branch at 2405 South Harwood Street, Dallas, Tex., in charge of D. S. Picard, assistant vice president.

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The Baker Oil Tools, Inc., Huntington Park, Calif., has transferred W. E. Routt, district representative from Houston to Dallas, Tex. Mr. Routt's Dallas address is 4222 Throckmorton Street.

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Lewis P. Campbell, a member of FWD dealer sales division during the past year, has been appointed a district sales supervisor by the Four Wheel Drive Sales Co. of Clintonville, Wis. His territory will comprise Colorado, Wyoming, New Mexico, and parts of Nebraska and Texas.

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Roots-Connersville-Wilbraham, Connersville, Ind., recently shipped seven large gas pumps, of the rotary positive type, to plants of the Liquid Carbonic Corp. in Boston, Mass.; Norfolk, Va.; Buffalo, N. Y.; Philadelphia, Pa.; Atlanta, Ga., and Dallas, Tex. These pumps have 16-inch gear centers, with cases 42 inches in length.

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The Ohio Injector Co., Wadsworth, Ohio, is opening up its own warehouse stock at 11 San Jacinto Warehouse Building, Houston, Tex., with Carl Scholle in charge.

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Frank H. Gale, manager of conventions and exhibits of the General Electric Co., has been retired at his request after 43 years of service. L. W. Shugg has been appointed division manager of the publicity department to succeed Mr. Gale in charge of that work. Mr. Gale will continue as secretary-treasurer of the National Electric Light Association exhibitors' committee.

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The Poole Foundry & Machine Co., Woodberry, Baltimore, Md., has appointed the Rockfield-Davis Equipment Co., 1500 Seventeenth Street, Denver, Colo., as its representative in Colorado, Wyoming and New Mexico. The Denver company will carry a complete line of Poole flexible couplings.

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The Timken Steel & Tube Co., Canton, Ohio, has appointed Delaware Steel Servic, Inc., as its exclusive representative in the Philadelphia, Pa., district. The latter company, with general offices and warehouse at 1614 Summer Street, Philadelphia, is comprised of Gustaf Peterson, formerly of Ludlum Steel Co., and G. F. Wilson, formerly of Associated Alloy Steel Co. Stuart B. Matthews, formerly of Ludlum, is associated with them.

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The Russell, Burdsall & Ward Bolt & Nut Co. of Port Chester, N. Y., has been licensed by the Dardelet Threadlock Corp. to manufacture and sell "rivet-bolts" and other bolts and nuts with the Dardelet self-locking thread.

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E. A. Livingstone has been appointed a sales representative of the Babcock & Wilcox Co. and the Babcock & Wilcox Tube Co., with headquarters at 85 Liberty Street, New York.

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F. J. King, chief engineer of the Linde Air Products Co., 205 East Forty-second Street, New York, has been elected president of the Compressed Gas Manufacturers' Association.

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The fortieth anniversary of the Oster Manufacturing Co., of Cleveland, Ohio, manufacturer of pipe and bolt threading equipment, and the third of its merger with the Williams Tool Corp., of Erie, Pa., was celebrated at a gathering of officers and employes in the home of Arthur S. Gould, secretary of the two companies. Although the separate corporate names will be preserved, the combination will be known hereafter as Oster-Williams, Cleveland, Ohio.

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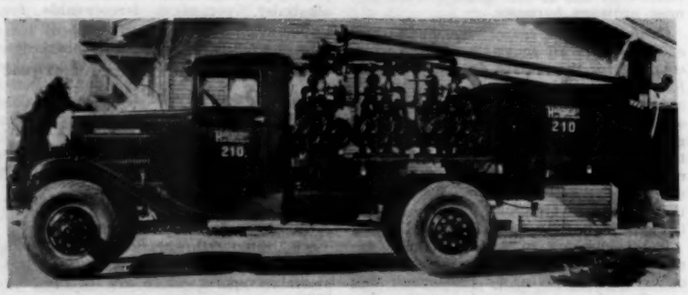
The Brewster Co., Inc., of Shreveport, La., manufacturer of oil well tools and supplies, has added acid treatment of chalk rock wells to its service, employing an acid formula worked out by its own chemists.

Acquires Marmon-Herrington All-Wheel-Drive Truck



The Halliburton Oil Well Cementing Co., Duncan, Okla., has purchased Marmon-Herrington all-wheel-drive, heavy-duty hauling equipment and has put into service the Marmon-Herrington model TL-30-4 truck shown in the accompanying illustration. This truck is equipped with the special appliances used by the Halliburton company in its oil field operations.

The Marmon-Herrington model illustrated has a gross capacity of almost 20,000 pounds. The drive is through all four wheels and the truck is equipped with both standard and auxiliary transmissions with a total of eight speeds forward and two speeds reverse. Front axle and front wheel drive construction is an exclusive Marmon-Herrington patented design.

Lost Time Is Cut Down by Two-Unit Welding Machine

A new four-bearing, self-excited, dual-control arcwelding machine, Model S.A., is now in production at the plant of Wilson Welder & Metals Co., Inc., North Bergen, N. J. This machine is built to meet the increasing demand for the high amperages and arc voltage required in speed and shielded arc welding. It offers the advantage of a two-unit machine with a flexible coupling, which permits the changing of the motor or the generator in case of failure, with a minimum loss of time.

This machine combines ruggedness of construction with simplicity and compactness of design. No electrical contact or connection is exposed. The only projecting parts are control handles, and these are placed so that they are unusually safe from injury. The voltmeter and ammeter (the only parts subject to breakage) are set at an angle which greatly reduces chances of damage.

Although all parts are protected, this machine has ready accessibility. Every part (except motor and generator) is visible, and can be adjusted or removed by loosening the wing nuts and lifting the side covers, which are hung on sturdy hinges.

In addition to the advantages enumerated the new S.A. welder has the following features:

By means of the Wilson dual control system, the voltage and amperage may be set independently, and the instruments may be read with ease.

The machine will weld at rated current in amperes, with 40 volts across arc, i.e., a high speed shielded arc.

It has at least 10 per cent higher efficiency when using high speed rods, due to higher arc voltage (40 volts).

It requires no exciter, with the result that idling loss is low.

It has large overload capacity.

It provides sparkless commutation at all loads.

It is equipped with dead front control (no live parts exposed).

Adapt Refrigeration to Oil-Testing Laboratory

Adaptation of the principles of household refrigeration to the extraordinary temperature demands of an oil-testing laboratory has been successfully achieved in equipment installed in the Pittsburgh testing laboratories of the Atlantic Refining Co. by the Frigidaire Corp., subsidiary of General Motors.

The refrigeration equipment provides simultaneously in different compartments temperatures ranging from freezing down to 60 degrees below zero. It is used for testing motor lubricants for the most severe climatic conditions under which automobiles and airplanes might be called upon to operate.

A storage chest, in which oils to go under test are placed preliminary to the actual test runs, is held at 32 degrees Fahrenheit, according to W. S. Dingfelder, refrigeration engineer who worked out the equipment. Adjacent to this is a cabinet consisting of two sections insulated with 6 inches of cork. One section has six compartments surrounded by brine carried at 15 degrees above zero. The second section has four sleeve compartments held at 25 degrees below zero.

An individual compartment 10"x2" inside dimensions is held at 60 degrees below zero for the final testing of lubricants. The equipment is refrigerated by a standard commercial refrigeration compressor with an ASRE rating of four-tenths ton.